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February 1989

MacUser

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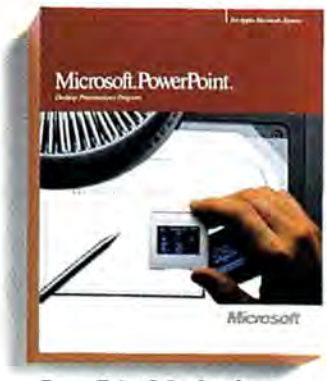
Do it yourself.

There's a widely held theory in the business world that the key to success is knowing how to delegate.

But for the best results, there's one task we suggest you assign strictly to yourself:

Putting together your own presentations.

The easiest, most cost-efficient way to assemble a professional-looking presentation—whether it's an informal briefing or a formal new-business pitch—is to control the whole project yourself. From conception to completion, right from your desktop.



PowerPoint 2.0 takes the stress out of putting together presentations – even when you have last-minute changes.

You won't need any help from type houses, illustrators, art departments, or typing pools.

In fact, all you'll really need is Microsoft® PowerPoint™ software and an Apple® Macintosh® to run it.

PowerPoint gives you the power to create your own picture-perfect overhead transparencies, flipcharts, 35mm color slides, speaker notes, and audience handouts. In such record-breaking time that there'll be nothing for you to do the night before the big day but sleep.

Its built-in word processor (complete with spelling checker) and drawing tools allow you to mix text and graphics in countless ways. Using different typefaces, logos, special effects like borders and dropshadows, and diagrams. Or you can copy charts, tables, and illustrations from other programs, like Microsoft Excel, with a simple cut and paste.

You can even input entire files from Macintosh programs such as MORE™ and ThinkTank,™ and turn them directly into PowerPoint slides.

Once you design an overall "look" for your presentation, PowerPoint allows you to standardize that format automatically. So you can use it slide after slide.

And you can make global changes easily with the Slide Master, which instantly executes your revisions throughout.

At any point along the way, the Slide Sorter feature lets you view slides one by one or scan your entire presentation at a glance, or rearrange the order with a simple point and click.

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If 35mm slides are in order, simply send your presentation to the nearest Genigraphics® center, the leading presentation graphics service bureau, and your slides will be on their way in 48 hours.

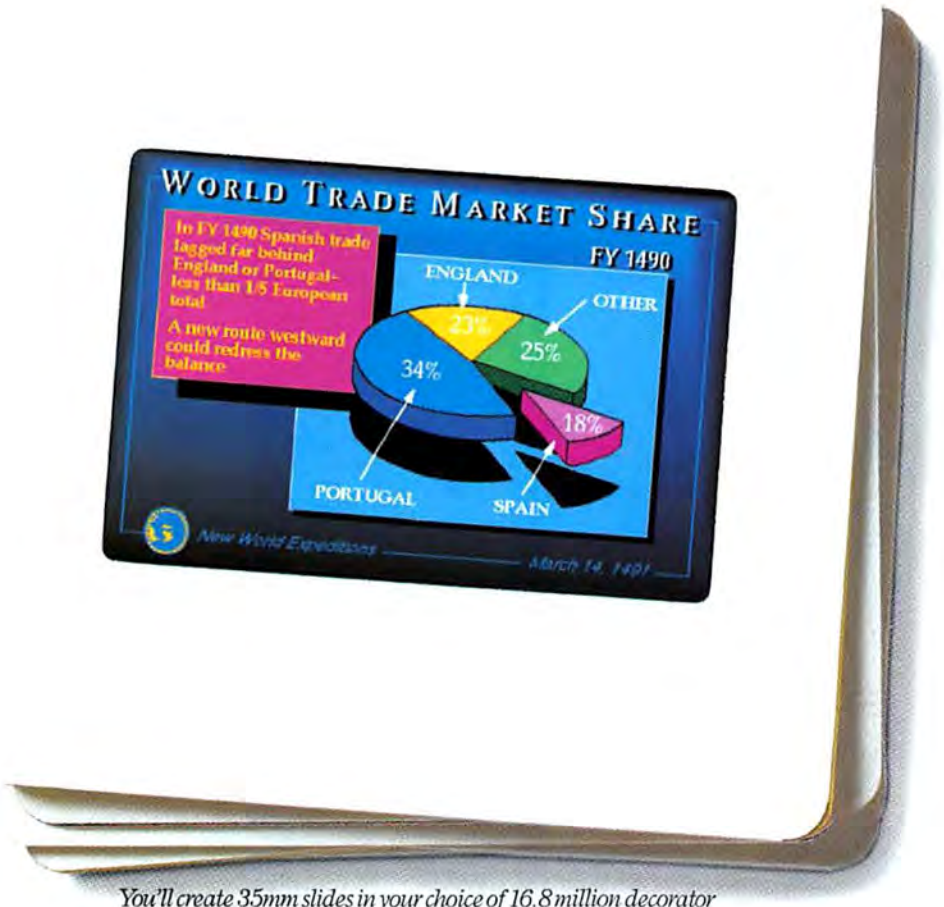
Lastly, last-minute changes need no longer cause traditional last-minute panic. Because a PowerPoint presentation is as easy to change as it is to create.

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And remember, the best part of doing a presentation all by yourself comes afterward.

When you get all the credit.

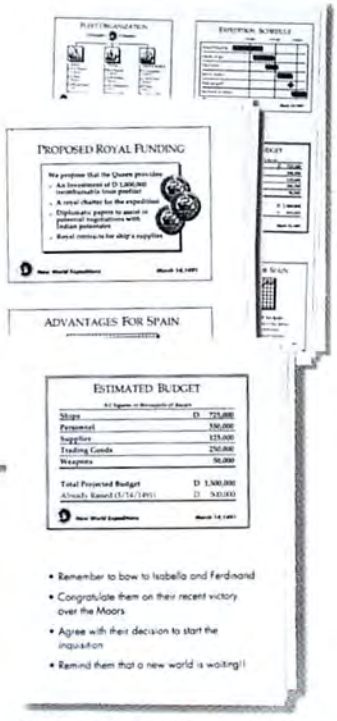
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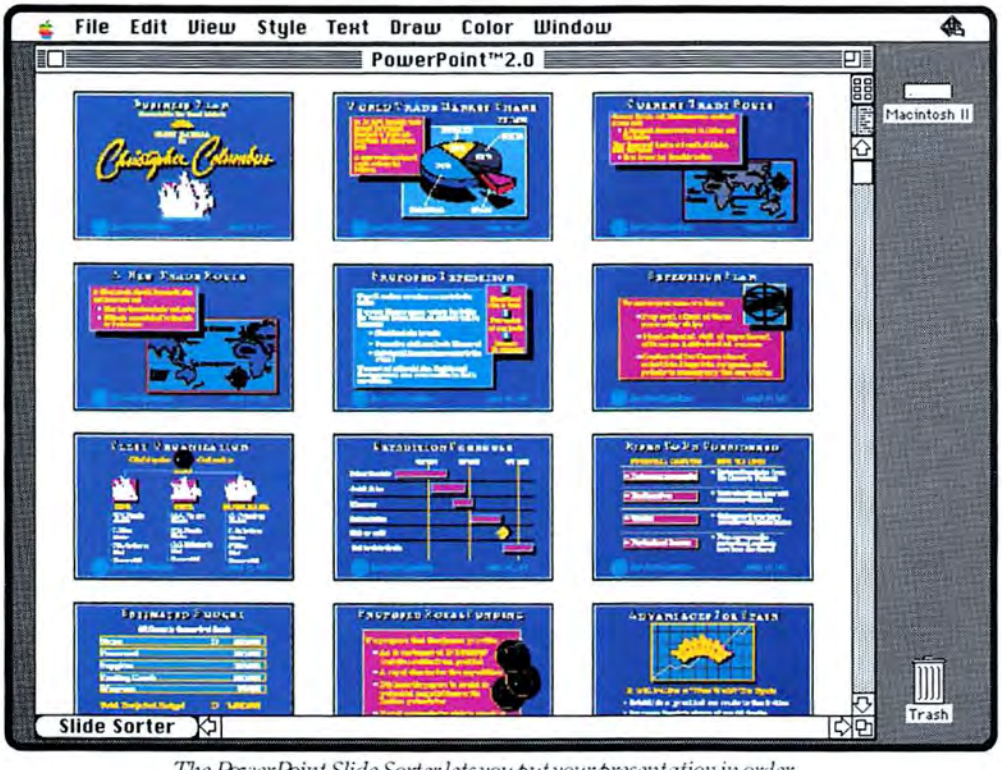
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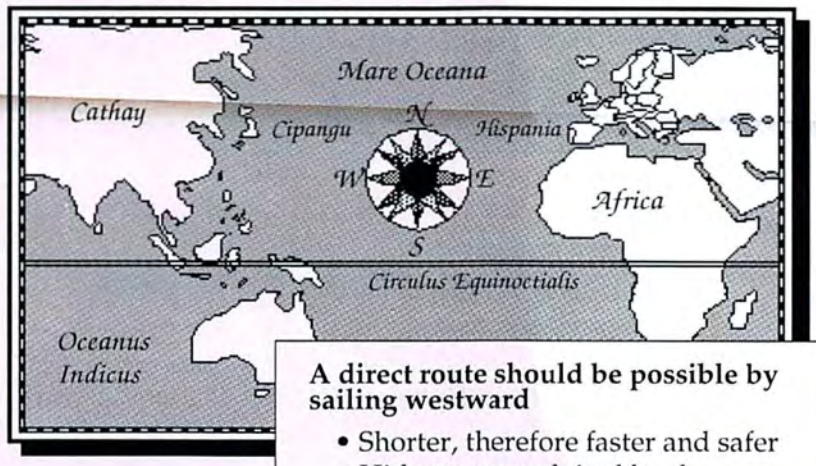


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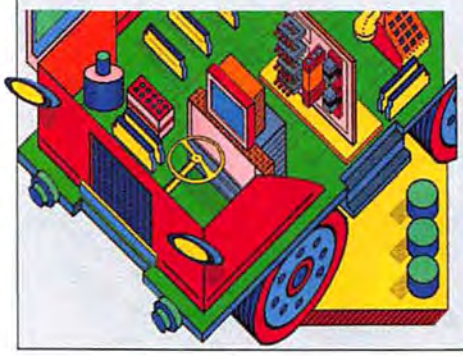


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MacUser is always looking for new and unusual products for our New on the Menu, News Line!, Quick Clicks, and Scrapbook sections, as well as for feature coverage. If you've got a product that you'd like to tell us about — whether it's new or an upgrade — send your letters and/or press releases to: Chip Carman, Technical Director, *MacUser* Magazine, 950 Tower Lane, 18th floor, Foster City, CA 94404.

TECHNICAL DIFFICULTIES AND HELP
Although we can't offer any telephone assistance, *MacUser* welcomes your technical questions. If you've got a Mac question or problem, send it to Chris Espinosa, The Help Folder, c/o *MacUser* Magazine, 950 Tower Lane, 18th floor, Foster City, CA 94404. Chris works for Apple, and if he can't give you an answer himself, he'll find someone who can. Because of the volume of mail we receive, we can't answer all of your questions so we also recommend that you take advantage of your local user groups. You can find the one nearest you by calling Apple toll-free at: (800) 538-9696, ext. 500.

TIPS, HINTS, AND PROGRAMS
We love to get tips and hints (on disk, please) from our readers. Any tips should be sent to The Tip Sheet, c/o *MacUser* Magazine, 950 Tower Lane, 18th floor, Foster City, CA 94404. We can't print every tip, but we try our best to pick the most interesting and representative ones for publication. We're also interested in hearing from any programmers who are interested in contributing to our utilities disk series or labs benchmark disk series. If interested, contact Chip Carman, Technical Director, at the same address.

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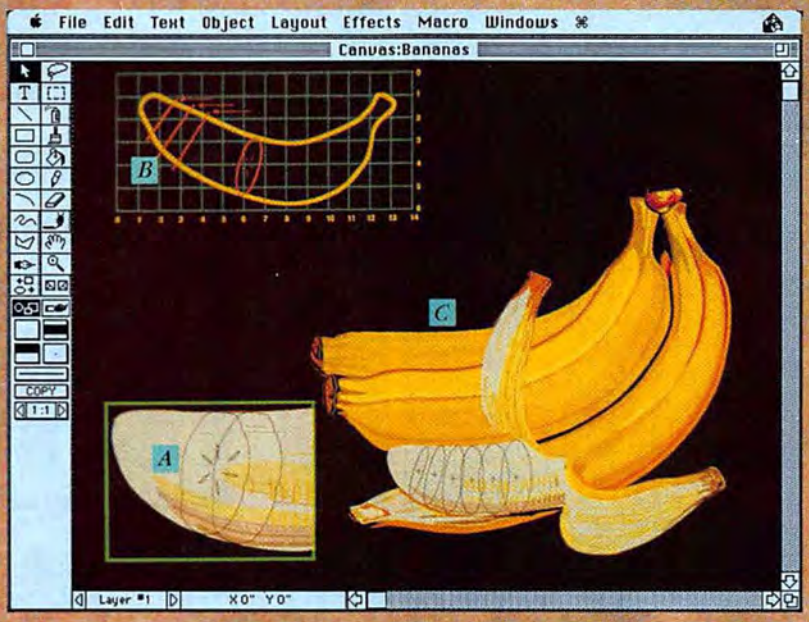
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A To an architect, fine hairlines like ours are pure poetry.

B Auto-tracing built this banana from a scanned-in produce ad. In split seconds.

C Multi-point bezier curves make drawing a bunch easier. Colors are added in layers.

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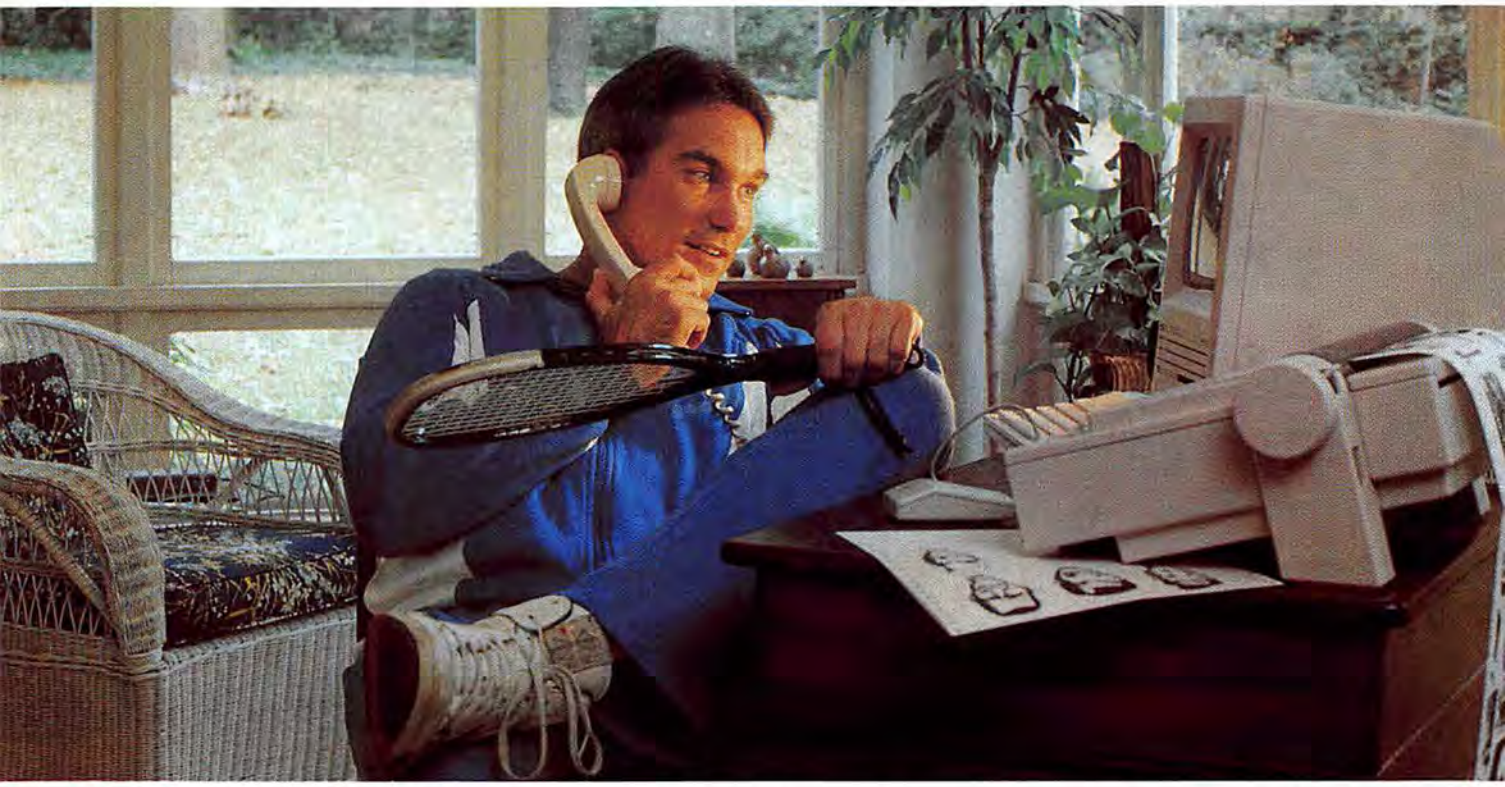
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Taking It to the Macs



By Frederic E. Davis

Jaded about my Mac II already? Maybe I am. When I first got my hands on a II, I was naive enough to think of it as a fast computer. What a disappointment, when it seemed to slow down over the course of the first six months I had it.

Just what had happened? Simply the inauguration of a new world of capabilities made possible by the Macintosh II. I had begun working with advanced image-processing applications, 24-bit color, databases, and music applications. As a result, I began manipulating huge data files, making ever greater demands on RAM, slipping my disks, tapping out my cache.

Ah, speed, where was thy zing? If I cared to look, I might have reminded myself that the compatible applications I ported over from my old Mac Plus ran like the wind on the 68020-based Mac II. But somehow I was no longer interested in those applications. Only the new CPU-intensive, math-intensive, RAM-intensive, color-intensive, storage-intensive applications interested me. An old adage was proving itself.

The more you get, the more you want. They don't call us *power users* for nothing.

The Macintosh is now capable of handling the most demanding of number crunching, and with that potential comes a thirst for speed, power, and storage. That's what this issue is about. Our features team looks at the kinds of upgrades you'll want to think about when the time comes. We've included a NuBus tour and a hands-on, graphical tutorial on RAM installation. This month, MacUser Labs gives you an objective look at accelerator boards, evaluating the performance boosts they are capable of providing. Creating your own dream machine will be easy by the time you've read this issue.

Steve Jobs has unveiled his own new dream machine, and it's fair enough to say that — at least for the time being — it's about 75 percent dream, 25 percent machine, as I noted last month. But the hype surrounding it has become a real driving force. No matter how vaporous the NeXT computer is right now, it's ironic to note that, as he did once before, Steve is once again shaping the agenda at Apple. Thanks to NeXT, Apple (and every other computer manufacturer, for that matter) will investigate erasable optical-disc storage. Thanks to NeXT, digital signal processing will become an important desktop technology. Thanks to NeXT, Apple will have to reevaluate its pricing strategies.

And the fact that Apple has already begun to respond to Steve's challenge is a good thing. Let's face it: The Mac is based on older technology. But in a shoot-out between NeXT and Apple, there stands to be one big winner: the Mac user. Even though the NeXT machine is extremely fast on paper, you can't buy one right now, no matter what you're willing to pay. And even if you could, there would be precious little real software you could run on it.

So "Two cheers!" for NeXT, for rousing Apple from its comfortable position high atop its laurels. Basically, Apple can respond with one (or both) of two different strategies: It can boost the power of the SE — with more slots, a faster processor, and color capabilities — or it can sacrifice some of the goodies on the II to come up with a more affordable version.

Given a choice between a Mac II and an SE, I'll take the II any day. But wouldn't it be nice if I didn't have to choose? Imagine the processing power of a II in an SE chassis. Imagine getting the best of both worlds: The color and open NuBus architecture of a II *and* the portability of a one-piece box. The inexpensive, built-in monitor *plus* the option to expand to a big-screen color monitor for presentations or detail work back at your desk. The beauty of a self-contained system with the upgradability of an open system. By the time you read this, Apple will probably have gone public with its decisions. Let's hope Apple doesn't forsake its roots — or its future.

An old adage was proving itself. The more you get, the more you want. They don't call us *power users* for nothing.

Meanwhile, Mac users don't have to be left behind in NeXT's dust while Apple ponders its next move. The trick is to keep an eye on the third-party add-in market for accelerator boards, memory, disk drives, NuBus boards, mass storage, and so on. Third-party manufacturers can move faster

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than Apple. They're usually smaller companies with less bureaucracy to deal with. In many cases, the genius engineer who comes up with the great new idea and the hard-nosed chief financial executive who decides whether to bankroll its development are the same person. So as soon as they spot a gap in Apple's products, these third-party manufacturers can jump in and fill it.

Here at *MacUser*, we're putting together a monster Mac system, piecing together the most powerful third-party add-ins — the *UltiMac*, if you will. It'll have all the muscle you could ask for and a base of thousands of Mac applications that run on it.

The UltiMac, unlike the NeXT computer, is not a promise but an available solution that can start boosting your productivity today.

Here are the specs we're aiming for with our souped-up Mac IIx: a 33-megahertz CPU, 24 megabytes of RAM, a 24-bit color monitor, 2.5 gigabytes of mass storage, a 20-megaflop DSP, and a 10-mips transputer. After we finish adding in all these goodies, we'll have a machine that not only outperforms the NeXT computer but also makes a microVAX look like a creeper. This ultimate Mac, unlike the NeXT computer, is not a promise but an available solution. All those add-ons are costly, but they can start boosting your productivity *today*. When we've finished building our Maximum Mac, we'll report back to you. In the meantime, I hope the performance suggestions in this issue help you take your Mac to the max.

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4098 Full Impact 1.0 ..... 249.
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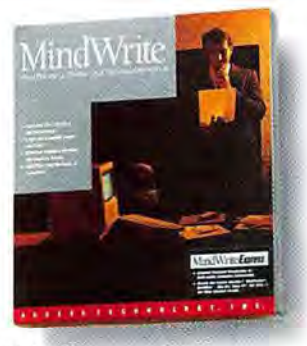
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4059 Laser FX Pack II ..... 29.
4060 Laser FX Pack III ..... 29.
4061 Laser FX Pack IV ..... 29.
4062 Laser FX Pack V ..... 29.
4063 Laser FX Pack VI ..... 29.
Pro Plus ... CP
4310 Wall Street Investor ..... 349.
ProVUE Development ... NCP
4582 Panorama 1.0 ..... 209.
Quark ... NCP
3230 Quark XPress 2.0 ..... call
4621 QuarkStyle ..... call



CE Software ... NCP
QuicKeys 1.1—Award-winning program features simple, powerful, and sequenceable macros. Take control of your Mac, and become a true power user ..... $53.

Rubicon Publishing ... CP
3272 Dinner At Eight-Encore Edition 1.03 . 45.
Satori ... NCP
3320 BulkMailer 3.22 ..... 79.
3321 BulkMailer Plus 3.22 ..... 195.
3322 Legal Billing 1.85 ..... 369.
3323 Legal Billing II 2.54 ..... 539.
3324 Project Billing 1.54 ..... 409.
Sensible Software ... NCP
3375 Sensible Grammar 1.1D ..... 54.
Silicon Beach Software ... NCP
3504 Silicon Press 1.1 ..... 41.
3508 World Builder 1.0 ..... 41.
3506 SuperPaint 1.1 ..... 79.
3507 Super3D 1.0 ..... 157.
3980 Digital Darkroom 1.0 ..... 157.
Simon & Schuster ... NCP
4230 *The Fully Powered Mac* Book ..... 24.



Fifth Generation Systems ... NCP
Suitcase II 1.0—Allows unlimited fonts & DAs without having to install them in your system. Load them on startup or on the fly ..... $45.
Special—Through Feb. 28, purchase Suitcase II and you may also purchase Pyro! for just $12.

3305 Typing Tutor IV 1.2 ..... 35.
SmethersBarnes ... NCP
1478 Prototyper 1.0 ..... 72.
SoftStyle ... NCP
3282 Printworks (Dot Matrix) 3.23 ..... 43.
3281 Printworks (Daisywheel) 3.0 ..... 56.
3283 Printworks (HP laser) 3.0 ..... 85.
SoftView ... NCP
3471 MacInUse 2.0 ..... 42.
3473 TaxView Planner 2.0 (1988-1992) ... 65.
3981 FormSet Business Forms Edition 1.1 55.
3470 MacInTax ..... 69.
Software Discoveries ... NCP
3374 Merge Write 1.0 ..... 34.
3373 Record Holder Plus 3.0 ..... 45.
Software Ventures ... NCP
3455 Microphone II 2.0 ..... 225.
Softworks, Inc. ... NCP
4601 Stack Cleaner ..... 29.
4599 HyperTools #1 ..... 59.
4600 HyperTools #2 ..... 59.
Solutions, International ... NCP
3448 SmartScrap & The Clipper 1.05 .... 46.
3449 SuperGlue 1.05 ..... 52.
3446 The Curator 1.05 ..... 79.
4308 BackFAX *(reqs. Apple FAX modem)* 129.
Spinnaker/Hayden ... CP
2329 SAT Score Improvement 1.0 ..... 58.
Springboard ... CP
3530 Certificate Maker 1.0 ..... 24.
3532 Certificate Maker Library Vol. 1 ..... 18.
3531 Early Games ..... 28.
4493 Atlas Explorer ..... 28.
4495 Family Matters ..... 28.
4492 Works of Art Assortment Series ..... 28.
4494 Works of Art Education Series ..... 28.
4496 Works of Art Holiday Series ..... 28.
4498 Works of Art Laser Art Business .... 59.
4499 Works of Art Laser Fonts Vol. 1 ..... 59.

4497 Top Honors ..... $59.
4500 Springboard Publisher ..... 109.
SuperMac Software ... NCP
3383 SuperSpool 5.0 ..... 54.
3382 SuperLaserSpool 2.0 ..... 82.
3378 Multi-User SuperLaserSpool 2.0 ... 199.
3377 Diskfit 1.4 ..... 54.
3379 Network Diskfit 1.4 ..... 199.
3381 Sentinel 2.0 ..... 155.
3380 PixelPaint 1.1 ..... 199.
4086 Acknowledge 1.0 ..... 349.
Survivor Software ... NCP
3289 MacMoney 3.01 ..... 62.
Symantec ... NCP
3982 MacSQZ! 1.05 ..... 49.
3983 S.U.M. 1.02 ..... 59.
3422 More II ..... 225.
3423 HFS Navigator 1.0 ..... 34.
3419 Laserspeed 1.6 ..... 55.
3421 Lightspeed Pascal 2.0 ..... 65.
3420 Lightspeed C 3.01 ..... 95.
3415 CAPP's for Lightspeed C 1.0 ..... 49.
3416 CAPP's for Lightspeed Pascal 1.0 .. 49.
Symmetry ... NCP
3318 HyperDA 1.1 ..... 38.
3317 Acta 2.01 ..... 46.
4504 Acta Advantage 1.0 ..... 69.
4160 PictureBase-WetPaint ..... 99.
Synergy ... NCP
3130 VersaTerm 3.20 ..... 69.
3129 KaleidaGraph 1.10 ..... 125.
3131 VersaTerm-PRO 2.20 ..... 195.
3G Graphics ... NCP
3942 Images with Impact!: Graphics and Symbols 1 ..... 59.
4583 Images with Impact!: Business 1 ... 75.
Think Educational ... CP
3615 MacEdge II 1.0 ..... 27.
3616 Mind Over Mac 1.4 ..... 27.



Farallon ... NCP
Timbuktu 2.0.1—A versatile network application that allows you to observe or control another Macintosh from your own over any LocalTalk network ..... $65.

910U

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MacConnection™ 1-800/622-5472

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A heavenly array.

T/Maker ... NCP

3640	ClickArt Personal Graphics	$28.
3642	ClickArt Publications	28.
3632	ClickArt Business Images	28.
3636	ClickArt Holidays	28.
3637	ClickArt Letters Vol. 1	28.
3638	ClickArt Letters Vol. 2	28.
3634	ClickArt Effects	28.
3633	Christian Images	35.
3635	EPS Illustrations	75.
3639	WriteNow 2.0	109.

TML Systems ... NCP

3548	Source Code Library II 1.0	42.
3549	TML Pascal II 1.0	79.

TOPS ... NCP

4189	TOPS Teleconnector *(DB-9)*	39.
4188	TOPS Teleconnector *(DIN-8)*	39.
3726	TOPS for DOS 2.0	119.
3723	TOPS Mac 2.0	119.
3724	NetPrint 2.0	119.
4598	TOPS FlashBox *(90 days)*	125.
3725	TOPS Repeater *(90 days)*	132.
3720	TOPS Flashcard *(90 days)*	169.
3417	InBox Starter Kit 2.2	199.
3418	InBox Connection Mac 2.2	75.

Traveling Software ... NCP

3729	LAP-LINK Mac 1.2	84.

True BASIC ... NCP

LANGUAGE & TOOLKITS

3587	True BASIC 2.0	59.
3570	Advanced String	49.
3574	Business Graphics	49.
3579	Mathematicians Toolkit	49.
3583	Scientific Graphics	49.
3584	Sorting & Searching	49.
3588	3D Graphics	49.
4178	Communications	49.

EDUCATIONAL SOFTWARE

3571	Algebra	35.
3573	Arithmetic	35.
3575	Calculus	35.
3577	Discrete Math *(multi-variate calculus)*	35.
3580	Pre-Calculus	35.
3581	Probability	35.
3586	Trigonometry	35.
3585	TrueSTAT	49.

Unicorn ... CP

3751	Animal Kingdom	27.



SoftView ... NCP

MacInTax—A sophisticated income tax preparation program that allows you to organize, store, and print out tax information. Includes 74 IRS forms and schedules ..... $69.

3752	Decimal Dungeon	$27.
3753	Fraction Action	27.
3755	Mac Robots	27.
3756	Math Wizard	27.
3754	Read-A-Rama	32.

William & Macias ... NCP

3779	DiskFinder 1.07	29.
3783	myDiskLabeler w/Color 2.8.1I	31.
3784	myDiskLabeler w/LaserWriter 2.8.1LI	34.

WordPerfect ... NCP

3800	WordPerfect Mac 1.0.1	185.

Zedcor ... NCP

3986	DeskPaint 2.0	69.
3985	ZBasic 5.0	105.

ENTERTAINMENT

Addison-Wesley ... NCP

4407	The Hobbit 1.0	24.
4474	Fellowship of the Ring 1.0	24.

Accolade ... CP

1184	Hardball	23.
4484	Mean 18	24.
4485	4th & Inches	24.



Discovery Software ... NCP

Arkanoid—Test the limits of your strategical thinking and quick reflexes as you break through level after level of mesmerizing brick formations. An entertainment classic.... $27.

Avalon Hill ... CP

1011	MacPro Football 2.0	28.

Blue Chip ... CP

1441	Millionaire	35.

Broderbund Software ... CP

4099	Shufflepuck Cafe *(air hockey)*	22.
4111	Moebius *(adventure & arcade)*	24.
1429	Ultima III	24.
4229	Where in World Carmen San Diego?	27.
1421	Ancient Art of War	27.
4540	Ancient Art of War at Sea 1.0	27.

Bullseye ... CP

1544	Ferrari Grand Prix	32.
4074	P51 Mustang Flight Simulator	32.

Discovery Software ... NCP

4408	Arkanoid	27.

Electronic Arts ... CP

1851	Scrabble 1.0	26.
1850	Reach for the Stars	26.
1842	Chessmaster 2000	28.
4064	Chuck Yeager Flight Simulator	32.
4588	Life & Death *(surgery simulation)*	32.

Epyx ... NCP

2037	Sub Battle Simulator	29.



Nolo Press ... NCP

WillMaker 3.0—Prepare your own valid will without a lawyer. Follows a simple question and answer format, allowing you to update your will whenever neccessary ..... $34.

Greene, Inc. ... CP

2268	Crystal Quest 2.2C	26.
4119	Crystal Quest w/Critter Editor *(NCP)*	42.

Infinity Software ... CP

2518	GO	27.
2519	Grand Slam Tennis	27.

MacroMind ... NCP

2772	Mazewars+	31.

MEDIAGENIC ... CP

1339	Shanghai	24.
4489	Sherlock Holmes: Crown Jewels	24.
4590	Corruption	27.
4486	Manhole	30.
4475	Quarterstaff	30.
4490	Might and Magic	36.
4592	Zork Zero	36.

Microsoft ... CP

2868	Flight Simulator	32.

Micro Sports ... NCP

2787	MSFL Pro League Football	32.

Miles Computing ... CP

2764	Down Hill Racer	24.
2767	Harrier Strike Mission II	27.
2765	Fool's Errand	27.

Mindscape ... CP

4083	Balance of Power 1990	30.
3987	Colony	30.
2743	Crossword Magic	30.
2745	Deja Vu	30.
4596	Deja Vu II	30.
2749	Shadowgate	30.
2750	Trust & Betrayal: Legacy of Siboot	30.
2751	Uninvited	30.

PBI Software ... CP

3110	Strategic Conquest Plus 1.3	35.

PCAI ... CP

4321	Lunar Rescue	29.
4212	MacCourses	32.
3144	MacGolf 2.0	35.
4320	MacGolf Classic	54.
4517	Road Racer 1.0	39.

Primera Software ... NCP

3169	Smash Hit Racquetball II	22.

Psion ... CP

3132	Psion Chess 1.6	31.

Sierra On-Line ... CP

4161	Mother Goose	19.
3397	Leisure Suit Larry	23.



"My prayers have been answered."

"Dear MacConnection,

"MacConnection has been my favorite source for Macintosh products since January, 1985. Some clergymen are skeptics about advertising claims, but you made a believer out of me! I phoned in my last order at 4:30 PM on Friday afternoon. My order arrived before 10:00 AM on Saturday morning! My prayers have been answered!

"In addition, MacConnection's usually fine advertising has consistently offered the best selection of software and accessories for the Macintosh, and at prices that make ordering from anyone else unreasonable.

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Rev. C. H. Readout, Jr.
Pastor, Apostolic Church
Enfield, CT

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Just for the record, all the ads in this series feature real live MacConnection customers and the real live letters they wrote us. Really!

without delay.

Nutmeg Systems ... 90 days

2992	15" Monitor for Mac Plus	1195.
2994	15" Monitor for Mac SE	1195.
2993	15" Monitor for Mac II	1295.
4002	19" Monitor for Mac Plus	1395.
4003	19" Monitor for Mac SE	1395.
4004	19" Monitor for Mac II	1495.

Nuvotech ... 1 year

3001	TurboNet ST *(DB-9)*	30.
3000	TurboNet ST *(DIN-8)*	30.

Orange Micro ... 1 year

4488	Grappler Spooler	39.
3036	Grappler C/Mac/GS	79.
4076	Grappler LQ	92.
4487	Grappler LS	92.

PCPC ... 2 years

3177	HD-WSI *(Apple HD-20 to SCSI)*	269.
3181	MacBottom HD 21 SCSI	659.
3180	MacBottom HD 21 w/Modem	759.
3185	MacBottom HD 32 SCSI	699.
3184	MacBottom HD 32 w/Modem	829.
3189	MacBottom HD 45 SCSI	859.
3188	MacBottom HD 45 w/Modem	979.

Practical Peripherals ... 5 years

3100	1200 Baud External Modem	79.
3102	2400 Baud External Modem	181.
3089	Mac Communications Pack	229.

Sharp ... 90 days

3453	JX-450 Color Scanner *(includes IEEE card and cable)*	5895.

Shiva ... 1 year

4347	NetBridge	279.
3444	NetSerial X232	289.
3443	NetModem V2400	479.

Summagraphics ... 90 days

4298	BitPad Plus ADB	329.

Thunderware ... 90 days

3648	ThunderScan 4.0 with PowerPort	199.
3646	MacPlus/SE Power Accessory	29.
3645	Mac II Power Accessory	42.

DISKS

2214	**Fuji** 3½" DS/DD Disks	18.
3297	**Sony** 3½" DS/DD Disks	19.
3772	**Verbatim** 3½" DS/DD Disks	19.
2792	**MAXELL** 3½" DS/DD Disks	20.



Practical Peripherals ... 5 years

Mac Communications Pack–Includes external 2400SA modem, cable, and top-selling communication software. Hayes compatible, auto-answer. A superior value! ..... **$229.**

INFORMATION SERVICES

CompuServe

1676	CompuServe Information Service	$24.
1671	Grolier's Online Encyclopedia	32.
1673	CompuServe Navigator 2.02	45.
1674	Standard Service/Navigator Bundle	59.

Dow Jones

1789	Dow Jones Membership Kit	24.
1785	Desktop Express 1.03	95.
1786	Market Manager Plus 2.0	189.

ACCESSORIES

Bantam Books

1403	Complete HyperCard Handbook	23.

Computer Coverup

1723	ImageWriter II Cover	8.
1722	ImageWriter LQ Cover	8.
1720	Mac Plus Cover Set	10.
1725	Mac SE Ext. Keyboard Cover Set	10.

Goldstein & Blair

2267	The Macintosh Bible *(2nd Edition)*	21.



Targus

Mac SE & Extended Keyboard Carry Case–Made of a special water-resistant material that's as strong as Cordura but much smoother so it won't wear out your clothing. Closed-cell foam protects against jolts ..... **$69.**

I/O Design ... lifetime

2378	MacLuggage HDware	49.
2379	MacLuggage Imageware II	49.
2376	MacLuggage Macinware Plus	64.
2381	MacLuggage Macinware SE	75.

MacConnection

4623	Solid Oak Disk Case, made by New England craftsman *(holds 90 disks)*	29.

Moustrak

2694	Moustrak Pad *(standard 7"x9")*	8.
2692	Moustrak Pad *(large 9"x11")*	9.
2693	Moustrak Pad L/F *(9"x11")*	10.
	Moustrak Designer Series *(Features selected photos from the book, "A Day in the Life of America.")*	
4077	Window Washer 1	12.
4006	Thunderstorm 2	12.
4007	Old Cajun 3	12.
4008	Vietnam Memorial 4	12.
4009	Dance Class 5	12.
4010	Tea Lesson 6	12.

Ribbons

3255	ImageWriter II Ribbon	4.
3261	ImageWriter II 4-color Ribbon	9.



Cutting Edge ... 1 Year

800K External Disk Drive–Sleek, new drive features the latest in technology. Compatible with 512KE, Plus, and SE. Includes LED disk access light. ..... **$175.**

3270	ImageWriter II Rainbow Six Pack	20.
3260	ImageWriter LQ Black Ribbon	17.
4011	ImageWriter LQ 4-color Ribbon	20.

Sopris Softworks ... lifetime

4017	ImageWriter II Cover	11.
4019	Mac SE & Ext. Keyboard Cover	15.
4018	LaserWriter II Cover	17.
4012	High Trek ImageWriter II carry case	49.
4013	High Trek Mac Plus carry case	59.
4014	High Trek Mac SE & ext. kybd. case	69.

Targus

3618	ImageWriter II Carry Case	49.
3617	Mac Plus/SE Carry Case	59.
4015	Mac SE & Ext. Kybd. Carry Case	69.

OUR POLICY

- We accept VISA and MASTERCARD.
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- Your card is not charged until we ship.
- If we must ship a partial order, we never charge freight on the shipment(s) that complete the order.
- No sales tax.
- All U.S. shipments insured; no additional charge.
- APO/FPO orders shipped 1st Class Mail, charged by weight.
- Allow 1 week for personal and company checks to clear.
- COD max. $1000. Cash or certified check.
- 120 day limited warranty on all products. Defective software replaced immediately. Defective hardware repaired or replaced at our discretion. All items subject to availability. Prices subject to change without notice.
- To order, call us anytime Monday through Friday 9:00 to 9:00 EST, or Saturday 9:00 to 5:30 EST. You can call our business offices at 603/446-7711 Monday through Friday 9:00 to 5:30 EST.

SHIPPING

Continental US: Barring massive computer failures and other natural or unnatural catastrophes, all non-C.O.D. orders phoned into MacConnection by 8 PM EST will ship Airborne the same night for next day delivery, except for those within UPS Ground Zone 1 (which is also an overnight service). The total freight charge on any order placed into MacConnection is now $3. Backorders will also ship Airborne overnight at no additional charge. Some areas require an additional day delivery.

Hawaii, Alaska and Outside Continental US: Call 603/446-7711 for information.

Orders shipped

3394	King's Quest I	$29.
3395	King's Quest II	29.
3396	King's Quest III	29.
3399	Space Quest	29.
3400	Space Quest II	29.
3398	Police Quest	29.
	Silicon Beach Software ... NCP	
3500	Airborne! *(CP)*	20.
3505	Enchanted Scepters *(CP)*	21.
3503	Dark Castle 1.1	27.
3502	Beyond Dark Castle	27.
3501	Apache Strike 1.1 *(MacSE & II)*	27.
	Simon & Schuster ... CP	
3303	Star Trek—Kobayashi Alternative	24.
3304	Promethian Prophecy	24.
	Sir-Tech ... CP	
3347	Mac Wizardry	35.
	Softstream, Inc. ... NCP	
4071	Mac•Man *(w/adapter)*	24.
4072	The Solitaire DA	24.
4073	Colour Billiards	35.
4078	Game Pak *(above 3 titles)*	75.
	SPHERE, Inc. ... NCP	
4175	Solitaire Royale *(for Mac SE)*	20.
4001	Solitaire Royale *(for Mac II)*	20.
3464	Tetris 1.1	20.
4472	Tetris *(for Mac II)*	24.
3462	PT-109 1.0	26.
3460	GATO 1.42	26.
3461	Orbitor 1.1	26.
3459	Falcon 2.0	32.
	Spinnaker/Hayden ... CP	
2328	Sargon IV	29.
	XOR ... NCP	
3816	Pro Challenge	29.
3815	NFL Challenge	59.

HARDWARE

Manufacturer's standard limited warranty period is listed after each company name. Some products in their line may have other warranty periods.

1107	**1 Meg SIMMs**	.call for availability
	Abaton ... 5 years	
1188	ProPoint ADB	89.
4589	InterFax Modem	329.



Datadesk ... 2 years

Mac-101 Keyboard—Includes macro program, Masterstrokes, to assign keystrokes and mouse clicks to 15 function keys. Beige, Platinum, or ADB version ..... $145.

	Asher Engineering ... lifetime	
1212	Turbo Trackball ADB	$69.
1211	Quadlynx Trackball *(non ADB)*	69.
	AST Research ... 6 months	
1229	Mac 286	call
	Cutting Edge ... 1 year	
3988	CE 105ADB Keyboard w/QuicKeys	149.
3989	800k Disk Drive	175.
3990	The Wedge XL 30+ SCSI Drive	629.
3991	The Wedge XL 45+ SCSI Drive	829.
	Datadesk ... 2 years	
1819	MAC-101 Keyboard *(beige)*	145.
1820	MAC-101 Keyboard *(platinum)*	145.
1821	MAC-101 Keyboard *(ADB)*	145.
	Dove Computer ... 90 days	
1801	SCSI Interface/Port	109.
1807	MacSnap 524E	289.
1809	MacSnap 524S	379.
1811	MacSnap 548E	549.
1812	MacSnap 548S	599.
1800	MacSnap 2SE	439.
1797	MacSnap Plus 2	439.
	MAC SE 68020 ACCELERATOR BOARDS	
1793	MaraThon 020 MSE1	585.



SuperMac Software ... NCP

SuperLaserSpool 2.0—Fastest spooler around. Temporarily routes files to your hard disk for efficient background printing. Works with LaserWriter, LaserWriter II, and all ImageWriters ..... $82.

1794	MaraThon 020 MSE2 *(1 Meg)*	979.
1795	MaraThon 020 MSE3 *(math chip)*	779.
1796	MaraThon 020 MSE4 *(1 Meg/chip)*	1159.
4231	MaraThon 020 MSE4x4	2395.
1803	1024 Option	439.
4505	MaraThon 030 Accelerator 20MHz	649.
4515	MaraThon 030 Accelerator 25MHz	849.
4516	MaraThon 030 Accelerator 33MHz	1039.
	Ergotron ... 1 year	
2004	Mouse Cleaner 360°	15.
3992	The Muzzle *(covers power outlet)*	62.
1998	MacTilt *(platinum)*	68.
2000	MacTilt SE	68.
3993	Workstation A *(up to 40 lb monitor)*	call
3994	Workstation B *(up to 60 lb monitor)*	call
	Farallon Computing ... 1 year	
2202	PhoneNET-AppleTalk 120	9.
2203	PhoneNET PLUS *(DIN-8)*	35.
2204	PhoneNET PLUS *(DB-9)*	35.
2205	PhoneNET Punch Down Block	69.
2201	TrafficWatch	149.
2206	PhoneNET StarController	1289.
	FWB Software ... 1 year	
4263	PocketHammer40	1089.



TOPS ... 90 days

TOPS FlashBox—Easily and inexpensively increases the speed of your LocalTalk network up to 3 times. Use only in areas where you want greater speed or over the entire network ..... $125.

4264	PocketHammer80	$1639.
3998	Hammer91	2195.
3999	Hammer155	2995.
4000	Hammer300	4295.
	Hayes ... 2 years	
2300	Smartcom II 3.0B	88.
2304	Smartmodem 1200	299.
2307	Smartmodem 2400	449.
	Kensington ... 1 year	
2563	Mouse Pocket ADB	8.
2577	Mouseway *(mouse pad)*	8.
2569	Mac Plus or SE Cover	9.
4126	LaserWriter II Cover	17.
2589	Universal Printer Stand	15.
2562	Mouse Cleaning Kit w/Pocket	17.
2550	Disk Drive Cleaning Kit	20.
2580	Mac II Stand	20.
2545	Universal Copy Stand	22.
2573	Maccessories Tilt/Swivel	22.
2578	Extra Long ADB Keyboard Cable	25.
2556	Maccessories Anti-glare Filter	33.
2579	Mac II Monitor Cable Extension	33.
2559	Apple Security System	34.
2568	Maccessories SuperBase	34.
2585	Printer Muffler 80	43.
2586	Printer Muffler 80 Stand	24.
2583	Printer Muffler 132	58.
2584	Printer Muffler 132 Stand	24.
4070	System Saver SE	52.
2566	System Saver Mac *(platinum)*	64.
2546	Maccessories A-B Box	64.
2560	MasterPiece 400	64.
2561	MasterPiece Mac II	105.
2547	New Turbo Mouse ADB	109.
2576	New Turbo Mouse for Mac Plus	109.
	Koala Technologies ... 90 days	
2593	MacVision 2.0	219.
	Kraft Systems ... 1 year	
2600	3-Button QuickStick	39.
4082	3-Button QuickStick ADB	51.
	Kurta ... lifetime	
2604	IS ADB Tablet	255.
2605	Cordless 4 Button Cursor *(1 year)*	95.
	Mobius Technologies ... 1 year	
4470	Fanny Mac QT	65.
	MSC Technologies ... lifetime	
2808	A+ Mouse	65.
2809	A+ Mouse ADB	85.

Letters

Thanks, Diane Cheklich of Birmingham, Mich., for your concern about the environmental impact of the plastic wrapping bags (that we had been using to protect your issues of MacUser *from the perils of transportation). Diane notes that "while my issues are less likely to be damaged if they're delivered in plastic, I believe that this benefit is heavily outweighed by the adverse environmental impact of regularly generating a significant volume (how many subscribers are there to* MacUser *now?) of plastic that is not biodegradable. The earth is rapidly approaching its capacity to contain all the garbage that is being created." We share your concern for the environment, and you'll be happy to know that — because of the environmental concerns as well as for other logistical reasons — we've stopped using the plastic bags. If this results in excessive damage to the magazines in transit, we may be forced to reconsider. But we hope we can find solutions that keep both our readers and our planet happy.*

Keep those cards and letters coming (preferably on recycled paper). Send them to Letters to the Editor, c/o MacUser, *950 Tower Lane, 18th floor, Foster City, CA 94404. All letters become the property of* MacUser, *and we reserve the right to edit letters we print.*

SAFETY IN ALPHANUMERICS

Naturally no list of passwords could possibly specify all the ones that users should disqualify, but Joel McNamara's list (in "For Your Eyes Only," September '88) was a little too short. Some obvious passwords are not simple words but are personal, and users should be warned against them, too. For example, it's not a good idea to use your own name, your spouse's name, or the names of any of your kids for a password-protected file. Anyone who is motivated will eventually run through the whole list — both backward and forward.

CompuServe requires passwords that include at least one nonalphanumeric character. Including one somewhere in a password makes sense because it decreases the chances that it can be easily guessed. The most easily



remembered passwords are the ones that are obscure but personal.

Too little time and space is spent on data security by Mac users. My theory is that they are generally open types who don't feel the need to be suspicious. Maybe that's one reason why viruses came so late to the Mac, and that when they did, the first was a "peace message."

MARION DELAHAN
BARTLESVILLE, OKLA.

II LITTLE II LATE

Maybe it's just because we Mac II owners aren't the top of the heap anymore, but it seems to me that the Mac IIx is about the least exciting "new" model that Apple has ever introduced. Sure, the 1.4-megabyte floppies are great, but it's a crime to run a 68030 at 16 megahertz when 33-megahertz versions are available now.

And when (if?) Apple does produce a 25- or 33-megahertz Macintosh, the IIx will certainly become one of those mysterious "in-between" models like the Mac 512KE or Apple III. Wouldn't it have been nice if Apple had used some of those recent price increases to make some slight modifications to the Mac II motherboard, pop in the 030/882, and keep the name (and price) the same? Then the "real" 030 machine to be announced soon, running at 33 megahertz, would be a worthy successor to the Mac II.

My frustration was similar when Apple presented the Apple IIGS, running at 3 megahertz when it could have run at 8. Apple fans will take any speed increase they can get, but to keep the Macs competitive with IBM (and the II series with Atari and Commodore), Apple has to use all the technology that is available.



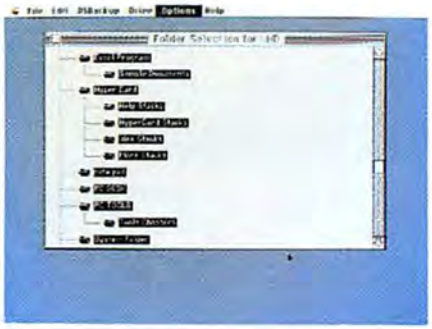
Hopefully Apple will be intimidated enough by Steve Jobs' 25-megahertz NeXT machine to do it right next time — and how about throwing in one of those nifty 256-megabyte erasable optical drives while you're at it, guys?

MIKE ANDERSON
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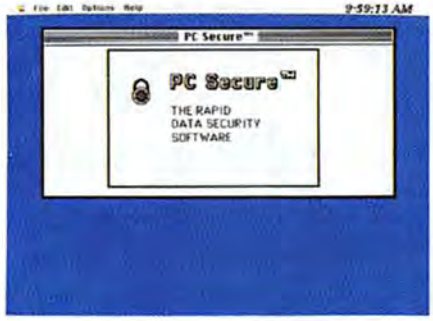
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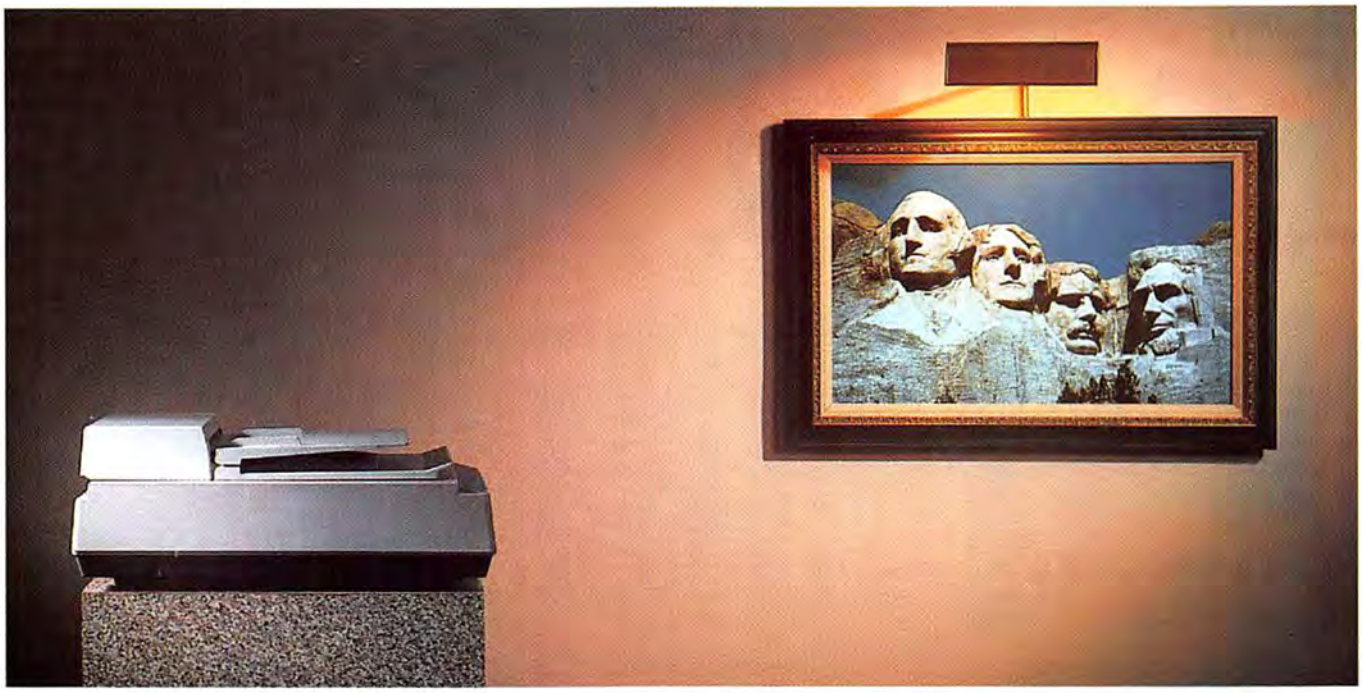


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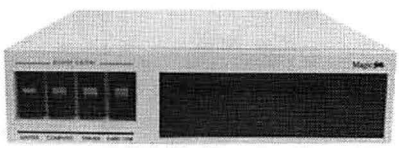
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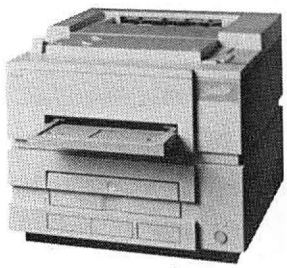
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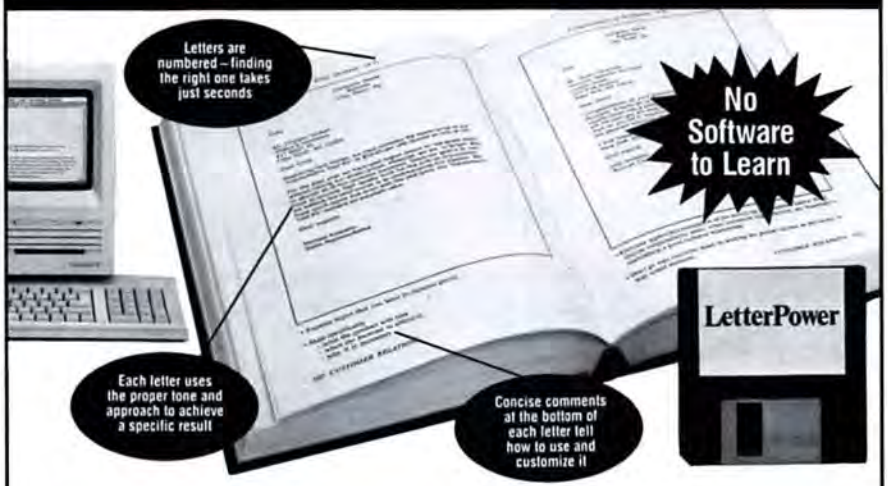
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Letters

October '88 Labs Report "True Colors," they might profit from our experience.

First, be certain to get the Sony-to-Mac II cable, not the NEC-to-Mac II cable, which looks identical. This little mix-up took the better part of a day to resolve. If your screen turns red when you plug in the monitor, you have the wrong cable.



Second, our technician had no luck fixing the severe border pin-cushion effect (which also affects the shapes of objects on the screen: circles look like ovals, etc.) by following the article's instructions. The dealer's technician was able to square up the screen.

Third, be sure to ask the technician to focus the monitor at the *same time* that he or she fixes the pin-cushion effect, thus avoiding yet another trip to the dealer.

I now have a monitor that works fairly well but a dealer who despises me.

DAVID L. FRANK
FRESNO, CALIF.

SCIENCE FACTION

While it doesn't mention the Macintosh or even Apple by name, the recent novel *Time Pressure* by Spider Robinson (Ace Books, 1988 — and, no, I don't know the author or work for the publisher) contains an immensely amusing fictional account (I *think* it's fictional . . . I *hope* it's fictional . . .) of the birth of the graphical interface and other assorted concepts that we all hold near and dear.

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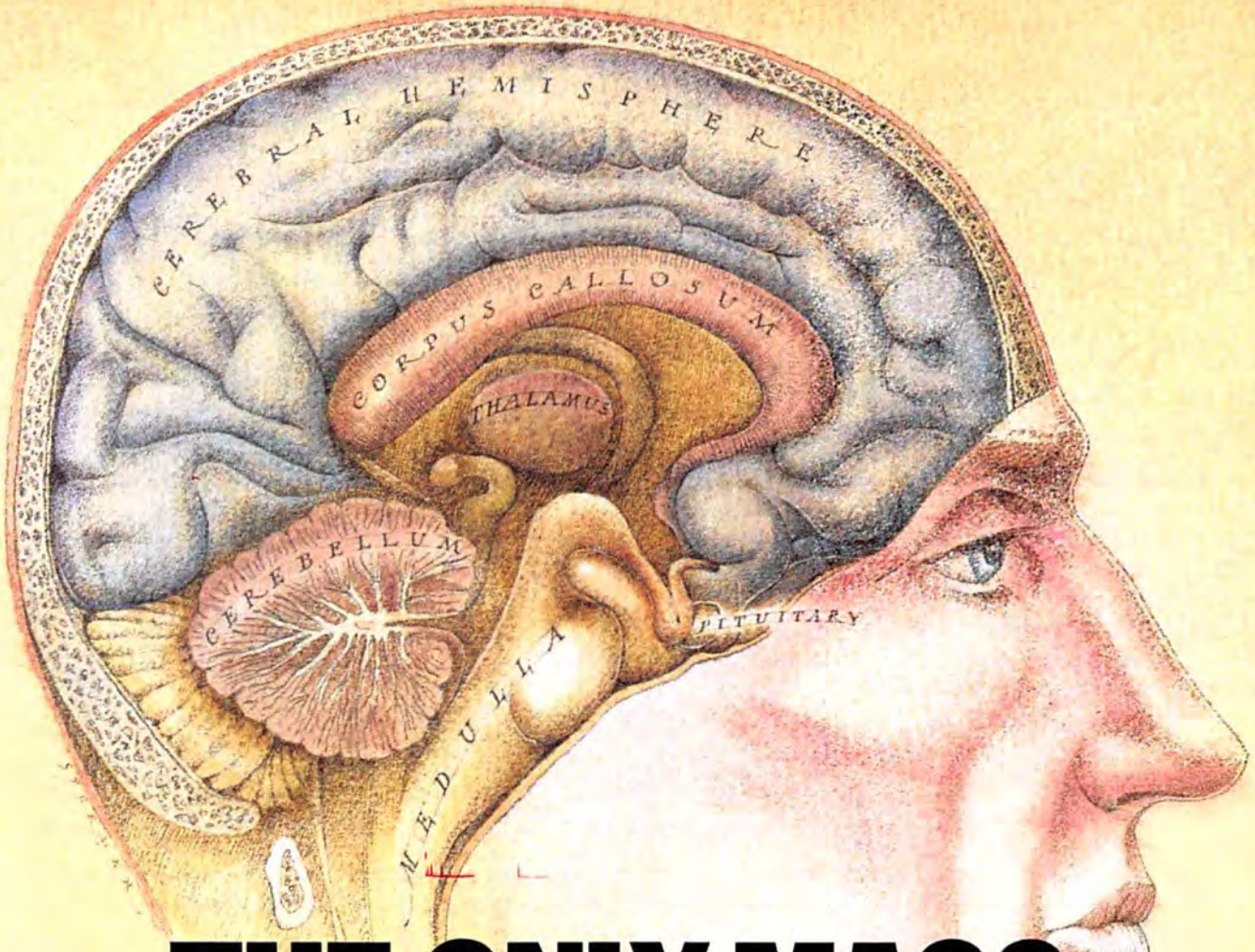
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Letters

tale by one of my favorite science fiction writers (it's also R-rated — reader beware), but if sci-fi is not your thing or if you just *have* to cheat, check out pages 99 through 105 in the paperback. A passing remark later in the book assigns literally cosmic importance to the invention of the Mac operating system (again without mentioning any names) and speculates about a brain/computer interface that uses a language called MindTalk. Know of any companies that use nomenclature like that? Finding these last two tidbits is left as an exercise for the reader.

Scrapbook has already become, in its brief tenure, my favorite part of your magazine. It is yet another reason, along with Dvorak, to read the book like a New York tabloid: back to front.

BILL DAUPHIN
CHERRY VALLEY, N.Y.

And bear in mind Douglas Adams' Dirk Gently's Holistic Detective Agency *(Pocket Books, 1988), which tells the tale of a hapless Mac programmer for WayForward Technologies, publishers of the unreleased program Reason, the program used by the Pentagon to back-construct a logical-sounding rationale for virtually any desired conclusion from any set of premises.*

Not to mix sci-fi and fantasy, but we understand that the unpublished fourth volume of the Lord of the Rings trilogy reflects the author's late-in-life interest in data-communications technology. The working title: The Tolkien Ring Network. — JZ

ON WIDOWS . . .

Your response to Randy Gamage's question about the Widow Control option in Word (in the September '88 issue) was that a widow, in word-processing terminology, is "the last line of a paragraph when it ends up all by itself at the top of a new page or column." I believe, however, that that is called an orphan. A widow is the first line of a paragraph left at the bottom of a page. Check your dictionary of word-processing terminologies.

PETER LAU
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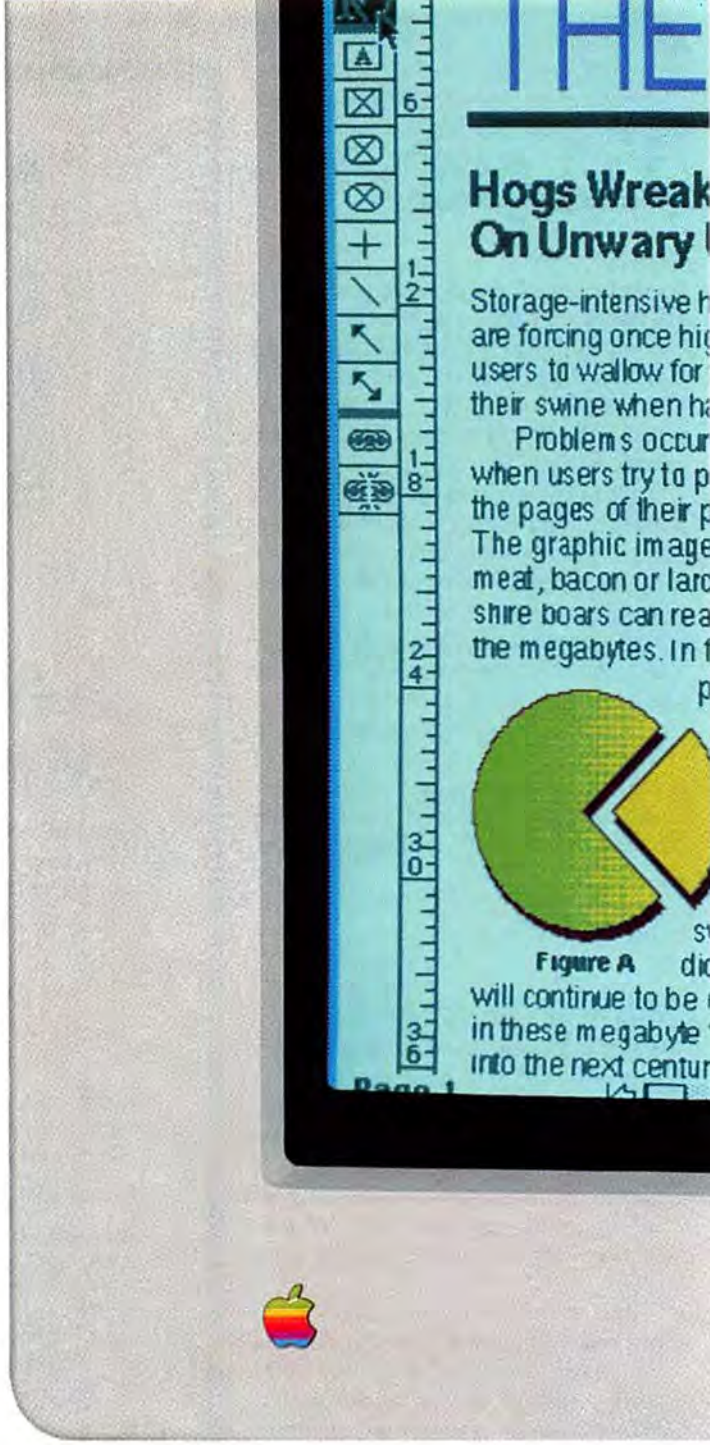
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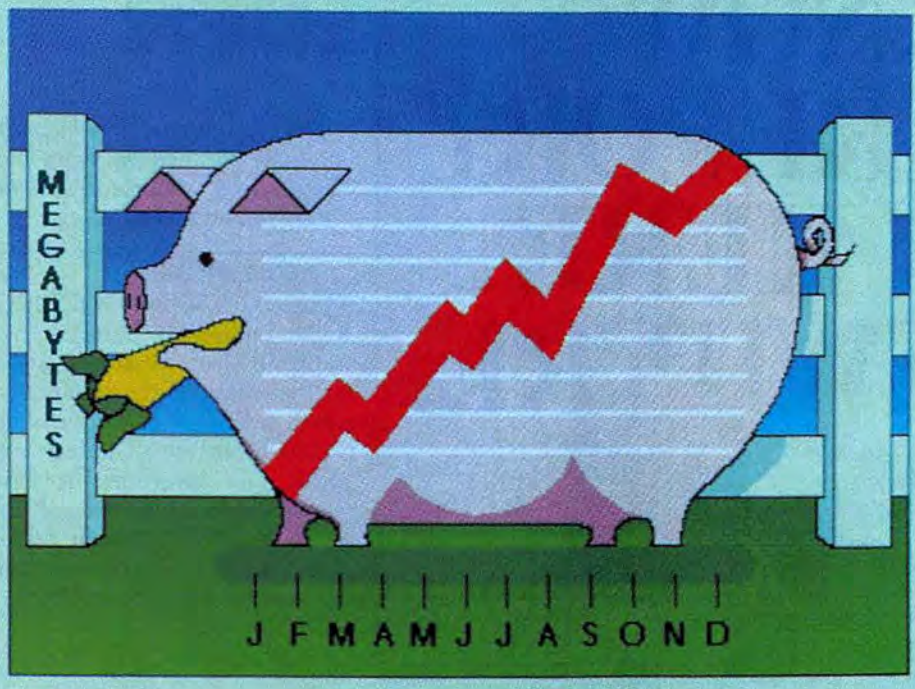
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Letters

Well, we did check — but unfortunately we checked the Word manual. You're right: Microsoft's definition differs from standard usage. — JZ

. . . AND ORPHANS

Fred Davis' Ode to MacJoy (in the November '88 issue) may seem warranted from where he sits, but it fails to consider the situation of the small, individual Mac users who supported Apple through its lean 1984–85 period. Our reward has been Apple's continuing back-of-the-hand disinterest in providing us with reasonably priced ancillary equipment and upgrade paths beyond the Plus.

HARRY S. HALL
ARCADIA, CALIF.

Frederic Davis has too much money and is completely out of touch with the difficulties that many less wealthy computer users have with Apple's greedy pricing policies. Fred, I'm sure very few people are tickled by your eager confession that you were "one of a select group of people who paid $15,000 for a Mac Plus."

The acceptance of the Macintosh in the business community increasingly means that the community will dictate the direction of development and marketing at Apple. I don't expect to see Apple's Mr. Pepsi losing sleep over such considerations. Yet the Mac press should realize that Apple's mission, as a now-mature corporation, is to make money. Nothing more, nothing less.

JOLYON WURR
OAKLAND, CALIF.

8 MAIL

I have trouble believing that John Dvorak ("The Disk 8 Disaster," November '88) was inexperienced enough to keep only one (count 'em: one!) type of backup for all his files, especially a hard-disk backup, when he knew he was receiving a new, more advanced model of Mac.

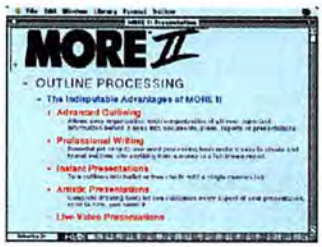
It is evidence that he reads your magazine less than he writes for it. The impatience he exhibited attempting to reload his files was an entertaining little tantrum, to be sure, and worthy of someone who has just bought his first computer or someone who does not

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Letters

have the persistence to weasel his way into an invitation-only party without an invitation. Too bad he has such a limited imagination. The Mac is suited to those who have a different approach to problem solving than to fly into a tizzy at the first sign of trouble (the second or third is the trick).

I personally *threaten* to throw my Mac out the window only once or twice a week. My brother (who owns an IBM) has actually done so, though he is noted for his mild disposition.

ALEX WHITNEY
FAIRFIELD, CONN.

WIN, LOSE, AND DRAW

The MacDraw II review in the November '88 issue was unfair! MacDraw II is a very smooth-running program with many features I had wished for in MacDraw 1.9 (like arrow keys to move objects). The interface is almost perfect, and the big font trouble is a thing of the past. Customizing the program is really well thought out. The zoom in and out works very accurately. Compared with its rivals, MacDraw II wins on all counts.

DANIEL VALLEE
RIVIERE-DU-LOUP, QUEBEC

GULLIVER'S TRAVAILS

I'm writing about your ho-hum review of Beyond Dark Castle. Yes, in a way it looks similar to the original Dark Castle, but BDC has some new and more challenging levels. They have very good sound effects, and the animation is really hot — the best. Here's my review:

What I found good about Beyond Dark Castle was the practice mode that can take you to any level for a good fight. The Black Knight's brewery is one of my favorites. After that level, I think they shouldn't have labyrinths, which I found purely boring. Also, when you get knocked out, your enemies should freeze and not be able to kill you. And I think there should be an easier way to get to the Black Knight. There should be many more new villains, and the orbs should have some kind of twinkly animation. Also, the Big Bird should have a more realistic sound, like the gargoyle has in the original game.



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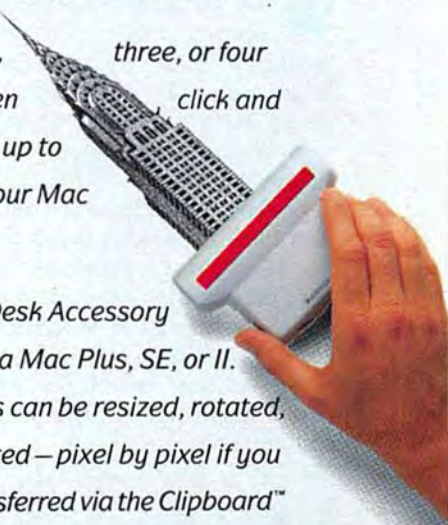
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Letters

But I still think it's excellent play. The quality of the game is what impresses me. I always go back to it. It's the *best* game I have ever played. I would give it five fat mice — no, rats.
GULLIVER PARASCANDOLO (AGE 9)
SAN MATEO, CALIF.

BLIGHT SPIRIT

When *MacUser*'s Scrapbook first appeared, I dismissed it as a self-indulgent bit of nothing edited by twelve-year-olds who thought they were clever. I now believe that assessment was too generous.

The November '88 "Top Ten" list by Jane Berliss about the few remaining uses for a 128K Mac is the most blatant example of fatheaded smugness I have yet to see in a Macintosh publication. Like all of the Mac rags, *MacUser* perpetuates the fiction that newer is better and that anyone who doesn't immediately dump yesterday's configuration in favor of today's glitch-ridden model is a hopeless case.

Generally this wrong-headed and just plain wrong bias is subtle — seldom showing anything other than Mac IIs on the covers and inside illustrations — but, then, the third-grade humor that permeates "Scrapbook" is about as subtle as Pee-wee Herman.



A tool that performs the user's task well is a good tool. A tool that does not is a poor tool. Age, platinum cases, or color monitors have nothing to do with it. For example, my four-year-old Imagewriter justifies itself by being a good tool — that is by reliably doing the job I demand of it. I sit at user-group meetings and listen to others complain about problems with their ImageWriter IIs and LQs, and I smile.

And I haven't missed the point that Scrapbook is supposed to be funny. But this kind of "humor" makes "Gilligan's Island" look like Noel Coward.
WILLIAM J. REYNOLDS
SIOUX FALLS, S.D.

The technological imperative, while seemingly motivated solely by the elitism of the user, is nonetheless also inextricably linked to the factor of consumer-available software products, the contemporary majority of which are incompatible with the more primitive incarnations of the machines. Or, to cite the vernacular of the aforementioned Mr. Herman, "I love my 128K Mac, but I wouldn't want to marry it." — Jane Berliss

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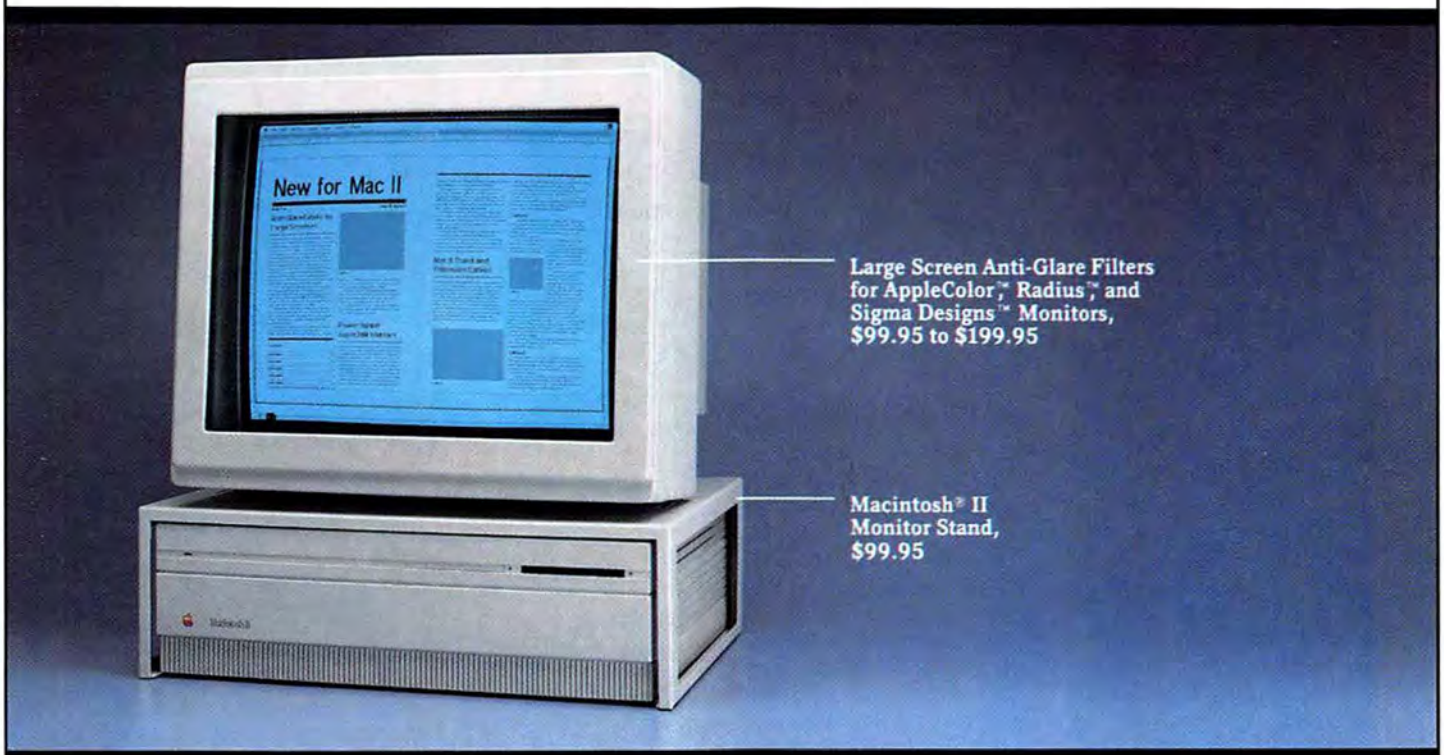
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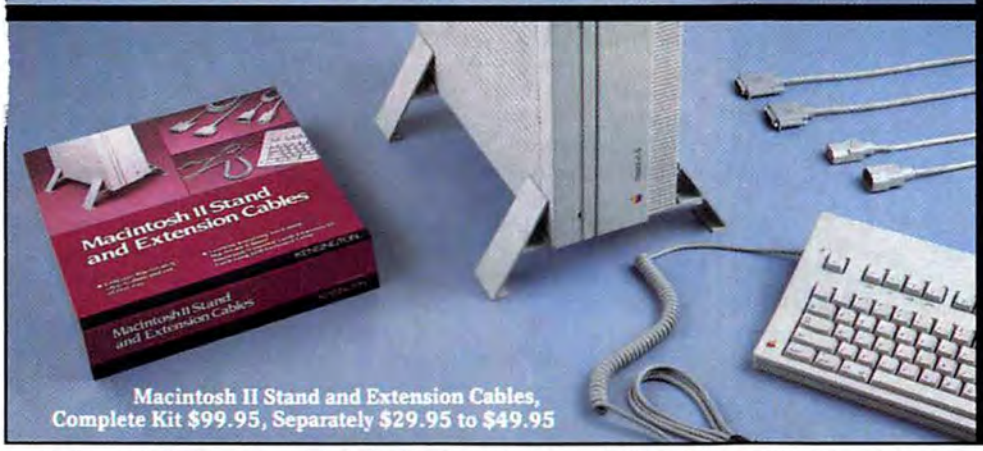


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EDITED BY RUSSELL ITO

For My NeXT Trick

The long-awaited formal announcement of the NeXT computer, to which Steve Jobs invited around 4,000 of his nearest and dearest — and the press — was greeted with the kind of hysteria and ticket scalping you might associate with the return of the Beatles. It was certainly *the* event of the Silicon Valley season, and everyone with the possible exception of a few professional cynics was there to see Jobs try to pull off the third major coup of his career. The jury is still out on whether he succeeded.

On settling into their assigned rows, attendees were greeted with a huge black-and-white NeXT logo on a screen. When Jobs walked to the microphone (about 45 minutes late), the logo changed to color — an obvious indication that the transition to Oz was successful. As the presentation went on, one thing became abundantly clear: About the only thing the press had been right about in its prognostications about the machine was its black color.

The $6,500 NeXT system includes a 17-inch screen; a keyboard; a mouse; a one-foot cube with 8 megabytes of RAM standard; and a read/write, 256-megabyte optical disk (see the box for full technical specs). The 400 dot-per-inch (dpi) laser printer, which uses the same Canon engine as the 300-dpi LaserWriter, comes as a $2,000 option, as do 330-megabyte and 660-megabyte Winchester drives. Everything — the display and the printer — is PostScript, and nothing is in color. Put all together, the system looks like *Bloom County*'s Banana Jr. as designed by Darth Vader's tailor.

The CPU runs off Motorola's 68030 memory management chip; the 68882 math chip (both at a 25-megahertz clip); and the Motorola 56001 digital signal processor, which supports the high-quality sound. The most interesting components are two proprietary very large-scale integration (VLSI) chips, referred to by Jobs, in what many see as a fit of hyperbole, as "mainframes on a chip." One of the chips handles data throughput, and one controls the optical disk. The boards are manufactured entirely by robotics in NeXT's Fremont, Calif., factory. The whole thing has an almost irresistible science-fiction flavor to it.

This is a machine with a software "platform" as well. The operating system is Mach, a UNIX variant. Both users and developers are served by NextStep, an object-oriented environment that supports both the user interface and the development of third-party applications. Included on the optical disk are WriteNow, Mathematica, Allegro Common LISP, a version of Sybase, an E-mail application, and the "Digital Library". The library is made up of the full text and graphics of *Webster's Ninth New Collegiate Dictionary, Webster's Collegiate Thesaurus, The Oxford Dictionary of Quotations,* and the Oxford University Press edition of *William Shakespeare: The Complete Works,* as well as all the NeXT manuals and technical documents. (It's like those lists of "Books You Want on a Desert Island"; the only things missing are the Bible and an obstetrics textbook.)

The two big surprises of the announcement were the use of an erasable optical storage medium from Canon and NeXT's licensing agreement with IBM. Together, they show Jobs as both a visionary and a hard-core pragmatist. The IBM announcement seems to indicate that even if the machine itself doesn't catch on, there will be a market for the technology. And while Jobs quietly focuses his efforts on the higher education market, third parties will be writing IBM business software that can be recompiled to run on NeXT if — no, when — Jobs decides to broaden his scope.

The most impressive thing about both the machine and the event was the technology and the excitement generated by the technology. For several hours, everyone present was surrounded by people who were more interested in possibilities than in corporate

Specifications for the NeXT Computer System

Standard Equipment Hardware: Internal

CPU	Motorola 68030 (25 MHz)
Floating-point processor	Motorola 68882 (25 MHz)
Digital signal processor	Motorola 56001 (25 MHz, 10 mips)
Power supply	Universal power supply (US, International)
Memory	8 Mb (expandable to 16 Mb)
Serial ports	2 (Mac compatible)
SCSI port	1 (Mac compatible)
NuBus slots	4 (1 used by motherboard)
Ethernet port	1

Hardware: Peripherals

MegaPixel Display	17-inch, 1120-x-832 pixels, 2 bits/pixel
Erasable optical disk drive	256 Mb
Audio (in MegaPixel display)	Speaker, in/out/microphone jacks

Software

Operating system	Mach (compatible with UNIX 4.3BSD)
Network support	TCP/IP, Sun Microsystems NFS
Software environment	NextStep, consisting of: Window Server (with Display PostScript), Workspace Manager, Application Kit, Interface Builder

Optional Equipment

Printer	400-dpi laser printer
Hard disk (Winchester)	330-Mb or 660-Mb (internal)



NeXTrasensory reception. Jobs sticks his NeXT out.



cost effectiveness. Even so, what's new is the combination, rather than the components.

The bottom line is that here we have a machine that is so tightly targeted for one market — education — that the company has no staff or procedures in place to sell to individual users — or to any other markets. And even within the target market, the NeXT machine is clearly oriented more toward the sciences than toward liberal arts. Equally clearly, the machine is not ready to go out to all those eager students of whatever departments. As I write this in October 1988, the first machines are due to ship next month — to developers. And a lot of those developers have already adopted a firm wait-and-see attitude.

Look at it this way: By the time you read this, there will probably be comparable optical storage for your Mac. With that and a can of black spray paint, you'll be ahead of the game.

— Louise Kohl

STacks On Atari

You're looking at HyperCard's Home Card, so naturally you figure you're working on a Mac. Wrong. It's an Atari ST. That's right, Gadgets by Small, the people who brought you Magic Sac, have now produced Spectre 128, a Macintosh Plus emulator.

Using the 128K ROMs, the Spectre 128 boasts improved compatibility with Mac programs. An earlier iteration of this emulator, Magic Sac, supposedly let the ST run Mac software, but there were some compatibility problems — it used the 64K ROMs. The Spectre 128 turns your Atari ST into a Mac Plus, only it gives you a bigger screen (30 percent bigger than the Mac Plus). So now you can run not only HyperCard but also such programs as MacPaint 2.0 and MacWrite 5.0. It also supports the Hierarchical File System (HFS) format (the 128K ROMs have HFS built into them) and Apple hard disks.

Don't expect the Spectre Mac to have any of the sound capabilities that you're used to, however. Spectre 128 doesn't even support Apple MIDI. Spectre 128, now shipping, sells for $179.95, but this doesn't include the 128K ROMs, which you need to purchase from computer resellers. For more information or to order your Spectre 128, call Gadgets by Small at (303) 791-6098 between 8:30 a.m. and 2:30 p.m., mountain standard time, or write them at 40 W. Littleton Blvd., Suite 210-211, Littleton, CO 80120.

— Kristi Coale

Touch 'n' Go

If using the mouse to press a button on a Mac screen has ever seemed peculiar to you, what you've really been waiting for is a touch screen. (If you've never pondered this before, perhaps you should.) Fortunately for those of you who have been losing sleep over this issue, MicroTouch Systems, which has been making Mac touch screens for over a year, has a couple of new models.

The Mac 'n Touch Add-in Kit (don't they know *'n'* has two apostrophes?) is a $695, dealer-installable package that mounts to the CRT face and behind the Mac bezel. With the controller mounted internally and the unit drawing power via the ADB port, a Mac outfitted with Mac 'n Touch looks indistinguishable from a regular Mac — except that you can do all your mouse actions just by touching the screen. The Add-in Kit is an ADB device that comes in sizes for the SE and Apple RGB monitors. MicroTouch also offers a 19-inch diagonal model for larger displays.

And for those users who don't want anyone monkeying around with their Macs' insides, MicroTouch has the Mac 'n Touch Snap-on Kit (sigh — only one apostrophe again). The Snap-on Kit fits only the SE and costs $595, but its major advantage is that everything mounts externally. The glass screen fits over the SE display, and the controller resides in a box that plugs into an ADB port.

The Mac 'n Touch systems are available from MicroTouch Systems, 10 State St., Woburn, MA 01801; (617) 935-0080.

— Russell Ito



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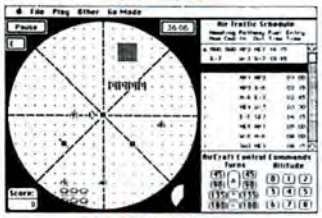
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EDITED BY GIL DAVIS

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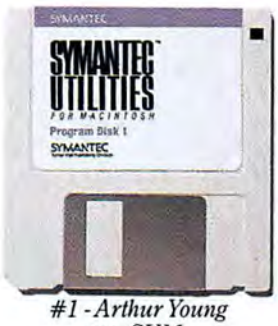
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Super Memory

Memory makers are breaking the Mac II memory barrier of 8 megabytes by stacking four 1-megabyte SIMMS where one 1-megabyte SiMM used to be, allowing a Mac II to hold a whopping 32 megabytes of RAM. Micron Technology of Boise, Idaho, charges $14,500 for 16 megabytes of its SuperSIMMs, while Pinnacle Sales in Santa Clara, Calif., charges $7,500 to $8,000 for the same 16 megabytes. But beware: You must have the correct ROM for the memory to work properly — check with the manufacturer.

Thin Bits . . . How to connect Macs to PCs is explained on a free 5.25-inch disk available from **Apple** dealers . . . **Sun Remarketing** has announced a national program in which it will buy used Macintoshes from computer dealers who want to accept customer trade-ins . . . The **Software Publishers Association** reports that Mac software sales for the first nine months of 1988 were up 87 percent over the previous year, compared with PC software sales, which rose only 45 percent . . . **Julian Systems** and **MacroMind** have agreed to bundle MacroMind's VideoWorks II software with Julian's NTSC Converter hardware to enable users to create animated presentations for video viewing . . . gigaPIX, from **Genius,** provides a missing link between Mac and video output. Any 8- to 24-bit Mac color image can be transferred to a Genius 8-millimeter tape unit, which records a video image one frame at a time. On receipt of the tape, Genius converts it to broadcast-quality color videotape in the D-1 format. . . . **DacSoftware,** which publishes Dac-Easy Light accounting software, has entered into a joint venture agreement with **Personal Computer Support Group** . . .



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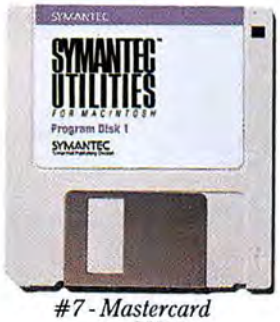
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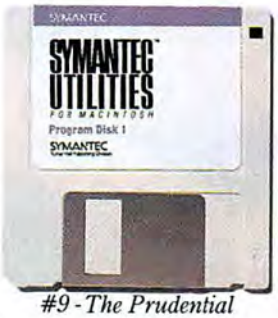
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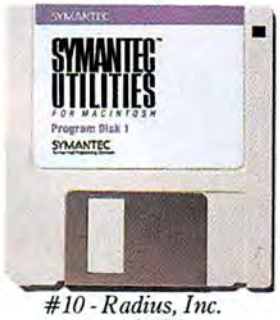
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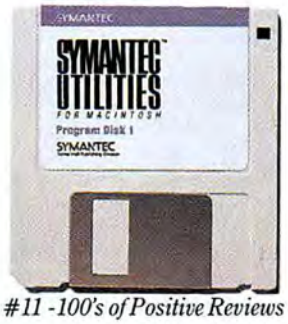
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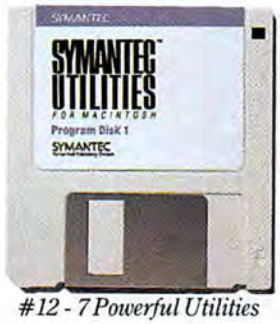
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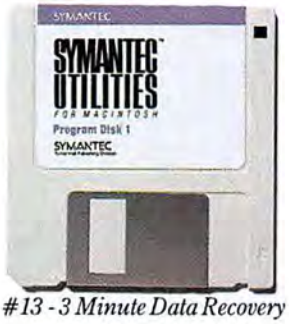
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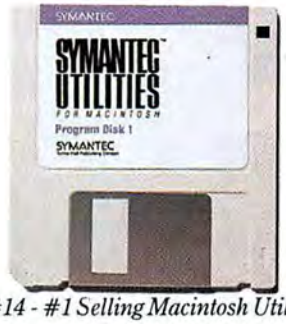
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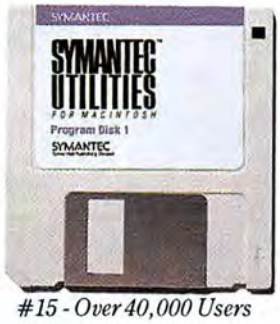
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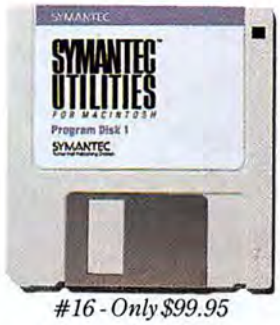
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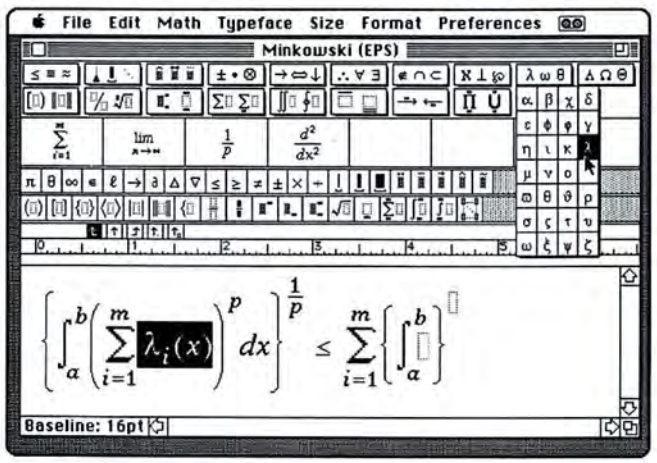
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NEWS LINE!

Speaking Out: Reactions to Apple's Price Increase

Apple recently raised the list prices for its Macintosh SE and II computers. A Mac II with no internal hard disk rose 29 percent to $4,869, and a bare SE with a standard keyboard rose 14 percent to $3,169. Mac Plus pricing remains at $1,799. Apple cites the rising cost of memory chips and increased demand as its reasons for the price jumps. We asked representatives of different parts of the Macintosh community for their reactions.

"I found the Mac price hikes pretty disappointing, considering that memory prices are decreasing and IBM has actually reduced some computer prices. People I know who were leaning toward buying a Mac are now leaning toward DOS machines because they find the pricing unrealistic and above their machine's performance.

"We have a shade under 1,200 members, and they were shocked by the price increases because they were totally unannounced. But they've recovered from it, as feelings tend to die down rather quickly."

— Brian Seligmann, president of the Portland Macintosh Users Group

"Almost all of my sales are into the corporate market, which buys mostly Mac IIs. Since the price increases, I've seen no decline in demand, and price doesn't even come up as a subject unless somebody hears about Macs that were ordered before the price hike. People are willing to pay because the Mac is such a great product. After all, if it's saving you $10,000 a month in typesetting costs, a $400 extra initial expense doesn't really make any difference."

— Heather Dunfield, Senior Sales Representative for ComputerLand in San Francisco

"My thesis is that Apple is growing so fast it's running out of parking lots, telephones, and space for employees. It also has a hiring freeze. I think they realize they're growing too fast but that slowing down sales would adversely impact their stock prices. So their solution is to raise prices, keep their income up, and then to reorganize, refocus, and increase their staff to position themselves to become a $10 billion company. That's a help to third-party suppliers like us, because we also need some breathing room to come up to speed."

— Steve Edelman, President of SuperMac Software

"We're a government agency that purchases a large number of Macs each year. Since we pay much lower prices than walk-in customers, Apple's price hikes don't impact us as much. In addition, we often need additional, high-end capabilities. This added hardware and software can easily cost more than the basic Mac, even if it's a IIx. And since we pay for them over a 24-month period, a few hundred dollars more isn't a major consideration."

— George Saunders, Computer Information Consultant with the Washington State Department of Transportation

The Credibility Gap



When Apple boosted prices on the Macintosh II last September by nearly 30 percent ($1,100 per system), higher memory prices were blamed. Apple senior vice president Charles M. Boesenberg said, "To continue fulfilling the increasingly high demand for our products, we are required to pursue more costly channels for dynamic random access memory (DRAM) acquisition, thereby increasing the component costs of our products."

The explanation seemed plausible. After all, hadn't there been a lot of press coverage of the chip shortage over the summer? Not just computer-oriented publications, but even *The New York Times* and *The Wall Street Journal* were writing about the DRAM drought. It was even discussed on network television news. Demand for semiconductors generally and DRAMs in particular exceeded supply during the first half of 1988. The U.S.-Japan trade agreement over the pricing of memory chips had curtailed supply and boosted prices. Strong demand did the rest of the job. Apple was merely responding to increased parts costs, wasn't it?

Well, if you believe that one, then I've got a bridge between lower Manhattan and Brooklyn, N.Y., that I can sell to you cheap. Just sign here and it's yours! I recognize you. Old P. T. Barnum said there's another one like you born every minute!

If, however, you can't help wondering whether something other than DRAM costs might have had something to do with Apple's price increases, let me congratulate you on your intuition and basic common sense. For the claim that DRAM prices drove Apple to raise prices does not hold up to even casual scrutiny. In fact, memory prices were actually falling again by the time Apple raised prices in September.

But even at the height of DRAM prices early last year, the $1,100 tacked onto the Mac II would have bought nearly 4 megabytes of memory. The base configuration of the Mac II included only 1 megabyte of memory, however, so it's a little hard to see how memory costs justify a price hike of that size. What's more, both the Mac Plus and the SE come standard with the same 1 megabyte of base memory. Yet the price hike on the SE was a more modest $400 (about 14 percent), and Apple didn't raise the price on the Plus at all.

Clearly Apple's explanation of the increases doesn't hold water. Were higher memory costs really the issue, then the prices of all models would have been increased in proportion to the memory they contained. Instead, we saw increases for the Mac II well out of proportion to the amount of memory it contains.

The real reason is that given strong demand and somewhat constrained production for the Macintosh II, Apple simply chose to charge what it thought the market would bear. The DRAM drought was an excuse to distract attention from Apple's desire to put more of the customer's money into its own pocket. The price increases were dictated not by memory costs but by the ratios of demand to supply. The Mac II, shortest in supply relative to demand, got the biggest boost. The price of the Mac Plus, with the lower demand of a soon-to-be-obsolete model (but still in great supply) remained unchanged.

The subsequent introduction of the IIx, of course, was as much a new price hike as it was a new model. The enormous success the Macintosh has had in businesses over the past year has owed a lot to the Mac II's ability to deliver the Mac's original ease of use combined with color graphics and a powerful, expandable system. The Mac II was able to deliver what, for the most part, the IBM PS/2 and compatible systems could only talk about. The reason Apple was able to raise prices substantially, however, was that the Mac's architecture remains proprietary. Unlike the MS-DOS world of the past and the OS/2 world of the future, the Macintosh world has only one vendor, hence no price competition.

Memory prices were actually falling again by the time Apple raised prices in September.

All that is likely to change over the year ahead, however. A Mac-like graphics user interface is gaining momentum in the MS-DOS and OS/2 worlds in the form of the Windows Presentation Manager. At the same time, other vendors are starting to get serious about possible Mac clones. UNIX-based alternatives, too, are emerging, from the standards of AT&T or OSF to the proprietary innovations of NeXT. Intensified competitive pressures on all sides are eroding Apple's ability to engage in the kind of pricing practices that long characterized IBM's mainframe systems. The result is that Apple's price increases of late 1987 are likely to be the last of their kind for some time.



By William Zachmann

Stretching Canvas

With its recent release of Canvas 2.0, Deneba Software has taken its first major evolutionary leap. To its nicely featured draw/paint application, Deneba has added full support for the Mac II's 16.7 million colors, a much-improved transition between its paint and draw modes, new power tools, and unlimited draw/paint layers.

Canvas 2.0's working window and tool palette have retained their basic look, but pressing the Option key when clicking on most tools now reveals pop-out choices for various effects and modes.

Among the new features are full-blown multipoint Bezier curves; automatic tracing of bit maps to produce editable object outlines; sophisticated polygon editing that includes path cutting and multiobject splicing; and the ability to skew, distort, and add perspective to anything from bit maps to text objects.

Precision tools and features include line thicknesses from 0.003 to 127 points, numerical scaling, rotating, positioning, auto-dimensioning lines, custom arrows, viewpoints that you can name and save, area and perimeter calculation, and an information window that tells you everything about a selected object.

Canvas's paint tool improvements include a customizable airbrush; the ability to jump instantly into paint mode the moment you use a paint tool; and a cropping operation that shrinks bitmapped objects to eliminate unused white space. Unlike PixelPaint or Studio/8, Canvas 2.0 limits a given paint item to only two of 16.7 million colors — one for the foreground (the ink) and one for the background. To get more colors, you must layer paintings and objects.

Canvas 2.0 is a free upgrade to registered Canvas owners. Owners of the version 1.0 DA will receive a free upgrade to the new DA, or they can upgrade to the full 2.0 package for $100.

First-time buyers can buy Canvas 2.0 for $299.95 from Deneba Software, 7855 N.W. 12th St., Suite 202, Miami, FL 33126; (305) 594-6965.

— Salvatore Parascandolo

See Deese Pictures

Stock photography has long been available to traditional publishers, but until the advent of CD-ROM, desktop publishers generally didn't have easy access to the catalogs of photos many agencies offer. That's where Comstock comes in. Comstock Desktop Photography is a CD-ROM with 449 gray-scale TIFF images culled from the agency's extensive collection of stock shots.

Purchasers of this CD-ROM, however, should know that these 75-dot-per-inch images come with some legal restrictions. The photos are only licensed for use in noncommercial in-house publications, comprehensive renderings, or rough layouts. They can't be used as clip art or as the basis of derivative works that will be used commercially unless you pay additional royalties.

Even with these restrictions, though, Comstock Desktop Photography ($500) should help improve those dreary company newsletters and announcements we've all come to know and loath. To get your CD-ROM, contact Comstock, The Comstock Building, 30 Irving Place, New York, NY 10003; (212) 353-8686.

—Russell Ito



Pretty as a picture. Comstock Desktop Photography is a CD-ROM with 449 TIFF versions of photos culled from their stock photo archives.

The NISUS One So Far

With all the brouhaha that has attended programs such as FullWrite Professional and any new version of Word, it's sometimes hard to realize that there may be other word processors out there. It's equally hard to believe that *any* word processor could live up to the hype preceding its appearance. Well, there's not only another excellent word processor to come, but it's been more or less unhyped so far.

Paragon Concepts, the company that developed and publishes QUED/M, is now developing a word processor called NISUS. A recent hands-on demo of the product has led to love at first sight. NISUS not only has all the bells and whistles, but they all work in the same key — and they work (so far, at least) just fine on a 1-megabyte machine.

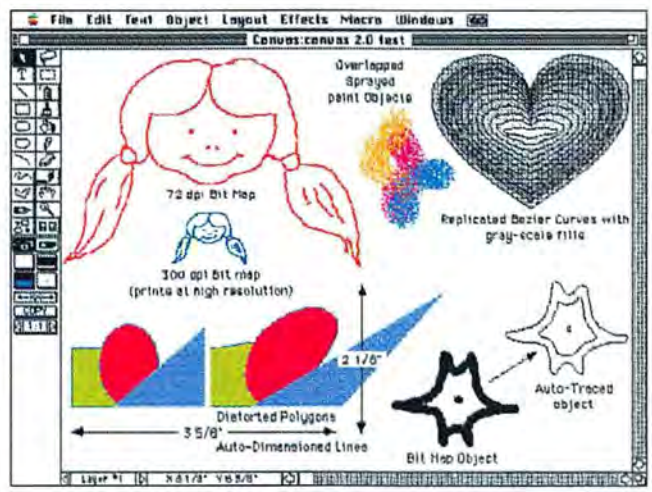
Here's a partial list of the features you can expect: ten editable clipboards, integrated text and graphics, multiple windows, a replace function that works in all open files at once, font- and style-sensitive search and replace, and multiple columns.

You're going to love the indexing. Highlight the word you want to include in the index, choose the index command from a menu, and the program opens a new document and adds all the relevant page numbers. (OK, you'll probably have to do some editing afterward, but how much of that do you have to do now?)

NISUS supports macro functions and comes with 50 macros already in place. It also comes with an extensive spelling checker, a thesaurus and an integrated glossary. One of the more impressive things about NISUS is that the programmers have consistently given you more than they had to. For instance, the "choose column" function lets you change font, point size, and so on in a single column, whether the manuscript has been set up in columns or not.

NISUS could be out by the time you read this, but if you can't find it, get in touch with Paragon Concepts at 4954 Sun Valley Road, Del Mar, CA 92014; (619) 481-1477, or outside California (800) 922-2993.

— Louise Kohl



Among Canvas 2.0's new talents are the tool palette items that have scallopped edges, which reveal pop-out menus when selected.

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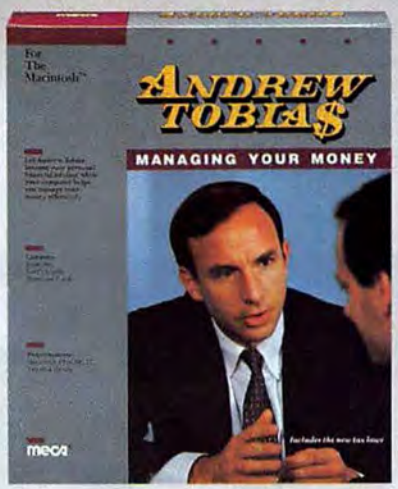
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M60 – 60 Mb External

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You won't find a brand-name 60 Mb drive for less. And you *still* get Mirror's EMI/RFI protection, heavy-duty power supply, AC convenience outlet, whisper-quiet cooling fan, rear-panel SCSI address, and other standard Mirror features. Compare. Then give us a call!

*Includes Mirror Technologies' hard drive value package.



VisionScan 200

$597

A VisionScan scanner – an unlimited supply of art & graphics! Anything you can lay on the flatbed can be quickly and easily entered into and manipulated with your Mac at half the price of competing flatbed scanners! A *BYTE* reviewer wrote, "If it were my money, I'd buy the Mirror Technology VisionScan. Its price/performance ratio is unequalled".

Vision Scan 300

$797

A Mirror exclusive: either works as a DA so you don't have to exit the application you're using. Get the 200 dpi *VisionScan 200* for excellent line art and affordable halftones, or the 300 dpi *300* for excellent line art and excellent halftones, and we'll send you Zedcor's DeskPaint, free! Optical character recognition software available.



Internal Hard Drives: 30, 40, 80, 100, 200

$497

Only Mirror Technologies allows you to add an internal hard disk in an SE already containing either two floppies or a floppy and a hard disk! Up to 200 additional Mb in your SE! And Mac II users can add *two* of our drives; up to 400Mb of internal storage, another Mirror exclusive!

*Includes Mirror Technologies' hard drive value package.

40, 80, 100, & 200 Mb: Call.



RM20 Removable Flexxy Disk Drive

$897

Think of it as a huge floppy disk. Using media developed Kodak and Verbatim, the flexxy disks carry a lifetime guarantee! Speed? Our RM20 is as fast as most 20 Mb hard drives! An extremely low cost per Mb for backup, for archiving, or for your primary storage medium. And we sell our RM20 for over a hundred dollars less than the competition, complete with Hard Driver™ formatting and diagnostic utility, Symantec's LaserSpeed™ LaserWriter print spooler, and numerous other utilities, including a backup utility. External SCSI address selector, our whisper-quiet cooling fan, built in AC EMI/rRFI noise filter.

Another number you'll love. *30 days* at our risk.

We know you can't get a better value anywhere. It's up to us to prove it to you. Try a Mirror product for 30 days; if you don't think it's a great value, call us, send it back, and we'll refund the price of your unit. We're confident that you will like our prices, our products and our service.

You'll get better help than from a computer store salesman.

If you need to know about any product, ask its maker. At Mirror, our Mac experts have been hand-picked and trained to be able to answer your questions. Better help than you'll get from salesmen in most computer stores. If you've ever had trouble getting help before, you'll find welcome relief at our number.

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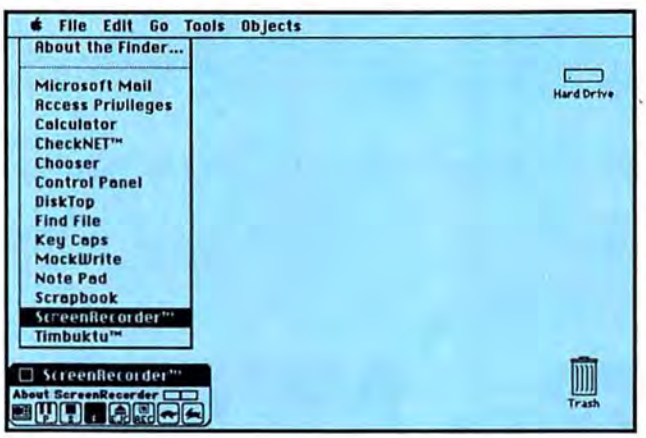
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NEW ON THE MENU

Play It Again, Mac

Sometimes a little knowledge can be an annoying thing — like when you're the only one in the office who knows how to transpose Excel rows and columns. For those occasions when you're tired of giving demos, Farallon Computing has introduced ScreenRecorder, a program that records your screen actions to disk and then, just like a videotape, lets you play back the sequence at various speeds.



If the thought of doing more demos gives you the D.T.'s, get ScreenRecorder. Farallon Computing's DA will let you record your screen actions to disk for playback later.

ScreenRecorder is a DA, so it's always available, and recorded sequences can be played back regardless of whether the application being demonstrated is present. It also includes a Looping Tape option that continuously records the last several minutes of a user's current session.

Because ScreenRecorder's on-screen controls look like those found on any tape recorder or VCR, using the package shouldn't require any extensive training.

ScreenRecorder lists for $195 and is available from Farallon Computing, 2150 Kittredge St., Berkeley, CA 94704; (415) 849-2331.

— Russell Ito

Digital Acrobatics

Just when you thought it was safe to return to your desktop, AlSoft gives you two hands to juggle with — Font/DA Juggler Plus and MasterJuggler. More than a mere mover of DAs and fonts, Juggler Plus lets you play Mac II sounds and select system sounds to play in place of the standard beep. You also have an FKey/Sound Mover for copying, renaming, renumbering, and removing Fkeys and sounds as well as having a Font/DA Utility to rename and renumber fonts and DAs.

MasterJuggler does all that Juggler Plus can do and more. For one thing, it's multiuser. You can assign sounds to specific functions through the HotSounds option, and you can play and convert any sound files from SoundCap, SoundWave, or SoundEdit to Mac II or HyperCard sound resource files. Beyond sound, MasterJuggler lets you configure or reconfigure operations for the application without having to use programs like ResEdit. You can also create a pop-up menu listing applications from your desktop, and you can open these without going back to the Finder.

Both programs work on any Mac from the 512KE up. Neither program is compatible with Suit-



case. Font/DA Juggler Plus sells for $59.95, MasterJuggler for $79.95. For more information, contact AlSoft at P.O. Box 927, Spring, TX 77383-0927; (713) 353-4090.

— Kristi Coale

CD-ROM: Alive and Twitching

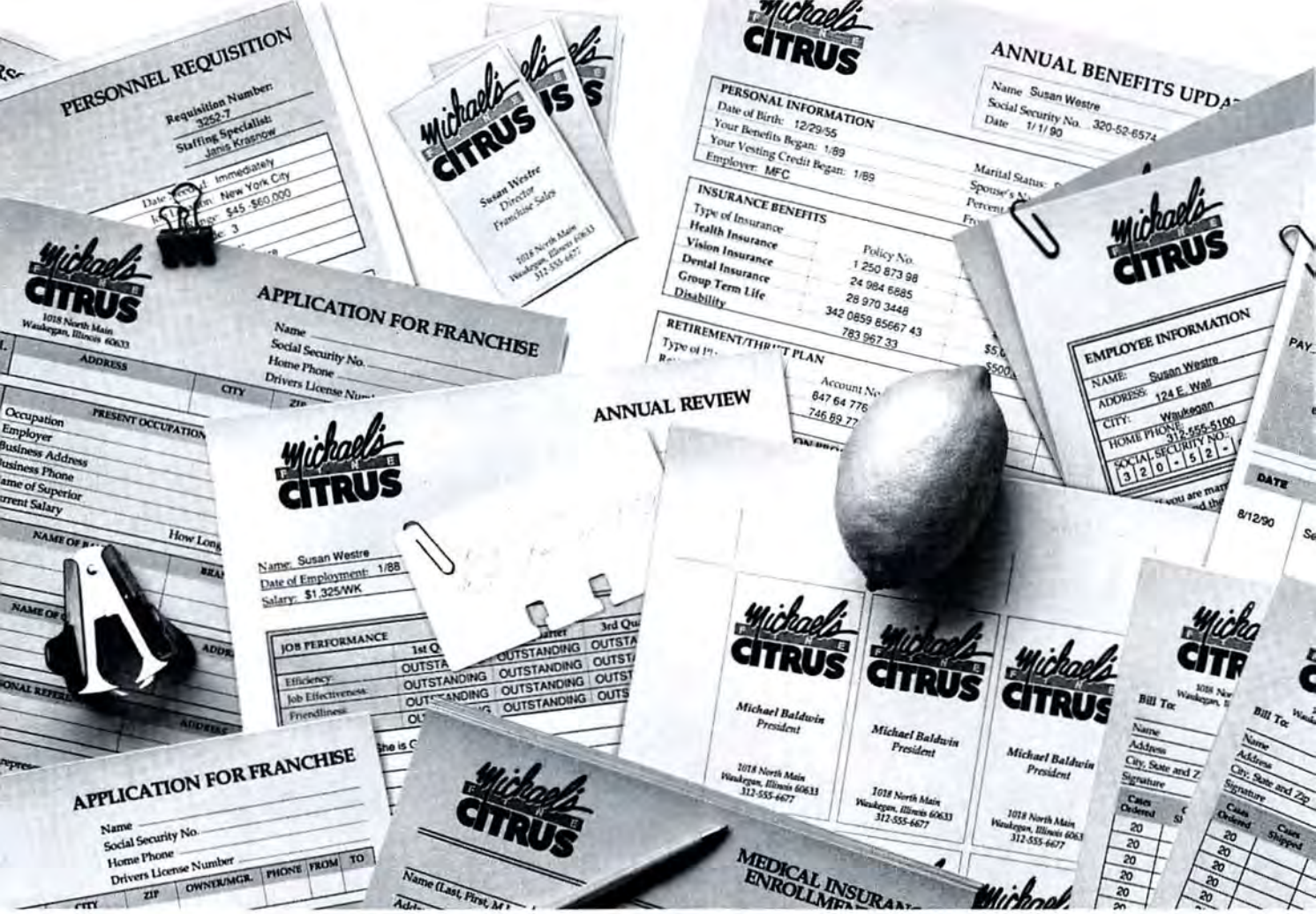
When Steve Jobs unveiled the erasable optical disk drive in the NeXT machine last October, a lot of pundits immediately pronounced the death of CD-ROM — why would anybody invest in a still-unproven read-only medium now that Canon's read/write optical technology was suddenly close enough to touch (if you distracted the security guards)?

The pundits may have a point. I wouldn't say the mood at the CD-ROM Expo '88 in Chicago a month earlier was comatose, but the joint was not exactly jumping. The biggest news was the announcement of yet another optical media format — CD-ROM XA — to join the ranks of CD-ROM, write once, read many (WORM); Digital Video Interactive (DVI); interactive videodisc (IVD); et al. CD-ROM XA — being developed and supported by optical media bigwigs Microsoft, Sony, and Philips — is actually intended to reduce the fragmentation rather than increase it. The idea is that if you follow the specifications of this extended architecture (hence the name XA) for CD-ROM discs, the discs will be compatible with Compact Disc-Interactive (CD-I) players in the future. CD-I and CD-ROM are similar technologies for developing interactive systems for accessing data — both put hundreds of megabytes of data, sound, and video on a single optical disc. The difference between them is that CD-ROM is designed to be used as a computer peripheral (with the computer running applications like HyperCard or VideoWorks), and CD-I is intended as a standalone that will run on an inexpensive, self-contained player. CD-I applications will be less sophisticated and less flexible, but they'll be more widely distributed. Meanwhile, CD-ROM XA provides a path for today's applications developed for the more specialized world of CD-ROM to move seamlessly toward tomorrow's potentially bigger world of CD-I.

At least that's the theory. There are still no CD-ROM titles that have galvanized the marketplace — we're all still waiting for the 1-2-3 of CD-ROM. There were a couple of new CD-ROMs for the Mac on the show floor, including a demo disc that Apple is now shipping with every AppleCD SC drive. The disc is aimed mostly at developers — who presumably constitute most of the market right now — and shows examples of how to use HyperCard as a front end for CD-ROM applications. Quantum Access (which can be contacted at 1700 West Loop S., Suite 1460, Houston, TX 77027; (713) 622-3211) also had a new version of its ClubMac disc of public domain software out.

The product everyone was talking about, though, was the new DynaBook from Scenario (which can be reached at 235 Holland St., Somerville, MA 02144; (617) 625-1818). Despite the Apple/PARC heritage of the name, DynaBook is an MS-DOS laptop that's designed specifically for CD-ROM applications. DynaBook has a built-in CD-ROM drive but no keyboard and no mouse; all commands are entered via a touch screen. (Resellers can port existing applications to touch-screen operation by using conversion software from Scenario.) CD-ROM applications usually don't have many commands, anyway; the goal is to combine simplicity and portability of massive amounts of data. The $4,995 DynaBook looks a lot like Apple's mythical Knowledge Navigator — it's a sleek, high-resolution, portable window on the world. Although Scenario hasn't ruled out the possibility, unfortunately there are no plans to develop a Mac version. We'll have to wait and see what Apple's laptop has to offer.

— Jon Zilber



NEW ON THE MENU

Terp the Lied Fantastic

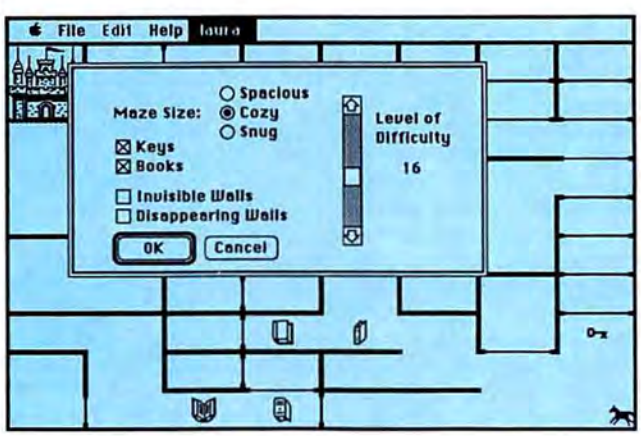
To many people, Mac music means the occasional beep, boing, or kiss goodbye. Sure, there's a four-voice synthesizer in there somewhere, but when was the last time you heard anything worth listening to a second time?

If you happen to own a copy of ConcertWare+ (or ConcertWare+MIDI), one solution is to boot ConcertWare+Music. In volumes 1 through 7, which list for $15 each, you can sample everything from music of the Renaissance to popular music from 1900–1930 to jazz with a French twist. There's even a disk of Christmas favorites for those who like a taste of the holiday spirit all year round.

Or, if you'd rather go for baroque, try some switched-on Praetorius. Terpsichore, which lists for $49.95, is a beautiful collection of music arranged and transcribed by Richard Rae. You can play the music either through the Mac's internal sound generator or ideally via MIDI to an external synthesizer (a multitimbral machine works best). The manual is nicely put together and supplies program notes as well as technical information. Why, it even tells you that you can learn more by contacting Great Wave Software, 5353 Scotts Valley Drive, Scotts Valley, CA 95066; (408) 438-1990.

Prerecorded MIDI sequences from other publishers (such as Soft-Drop and Syn-Comp Productions) are proliferating. Because of the complications entailed in licensing contemporary music for publication or performance, many sequence publishers are sticking with older material (for which the copyrights have expired) or with original music (commissioned with the sale in sequenced form in mind). One music publisher who owns the rights to a vast amount of contemporary music — Warner Brothers — has indicated that it plans to begin issuing prerecorded sequences by the end of 1988 in a new compact-disc format called CD+MIDI. Both digital music and digital sequences will be included.

— Christopher Breen



Different combinations of variables make the maze more challenging.

Amazing Numbers

Little Junior needs to work on math but would rather be playing games. Well, parents and teachers, sit Junior down in front of a Mac, turn on NumberMaze, and set Junior loose to wind a way through the maze to reach the castle.

NumberMaze by Great Wave Software gives children aged 5 to 12 the fun of solving mazes while giving them practice in basic math skills. Your progress



through the maze depends on your skills in solving numerical and word problems in counting, addition, subtraction, multiplication, and division. When you drag your playing piece (horse, car, and so on) to a doorway, the screen changes to a doorway, and a math problem appears. After solving several problems, you return to the maze, move through that doorway, and on to the next and the next set of problems. Numerous doors, disappearing and invisible walls, and keys and books to collect make the mazes more challenging. The problems get harder as the student's skills increase. The NumberMaze curriculum is based on five major math textbook series for grades one through six.

CustomMaze, included with NumberMaze, lets the parent or teacher personalize word problems by adding familiar names, choosing problem types and difficulty, and choosing mastery levels. The student's progress is monitored in the statistics window, and there's even a certificate of achievement that can be personalized and printed.

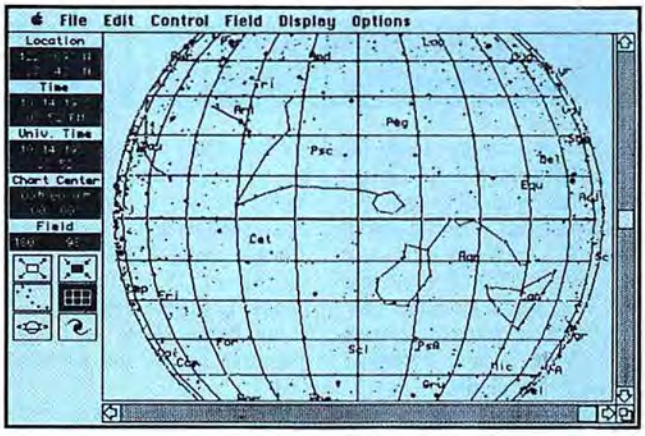
List price for NumberMaze is $49.95. For more information, contact Great Wave Software at 5353 Scotts Valley Drive, Scotts Valley, CA 95066; (408) 438-1990.

— Laura Johnson

Interplanetary Mac

Have you ever stared at the dusky evening sky and wondered whether that twinkling star gleaming above was Venus or Mars? Owning a telescope might help, but there is a new way to discover what's up above without using one. Voyager 1.0, the Interactive Desktop Planetarium from Carina Software, will take you where no one has gone before.

Designed and developed by a professional astronomer, Voyager lets the user explore the universe from a Mac. Click on any one of the many thousands of objects found on the Sky Chart, and Voyager will feed you plenty of scientific information. Find out how far Planet X (the supposed tenth planet) is from Earth, or find out how hot the Sun really is. Explore Aquarius and Pisces. View the galaxy from another planet, center on a specific constellation, or recreate the motion of the sky. Voyager's database holds all of this information and more. (A future version will even include satellites.)



A view of the celestial sphere appearing with all constellation names.

Travel to distant galaxies might only be a fantasy for now, but with Voyager 1.0, which retails for $99.95, learning about the stars hanging above is easy and fun. For more information, you can reach Carina Software at 830 Williams St., San Leandro, CA 94577; (415) 352-7328.

— Michele Stokol

Success



The road to success will always be paved in triplicate. But with new SmartForm™ software and Macintosh personal computers, it's no longer the tollway it once was.

The SmartForm concept is simple: you can't reduce the paperwork, so reduce the amount of paper. And the printing, shipping and storage costs that go with it.

SmartForm Designer™ includes all you need to whip out crisp, professional forms in a hurry. Fields, lists, check boxes, grids, combs, lines, ovals, rectangles—everything. And their sizes and locations can be pinpointed to the exact inch, centimeter, point or pica.

Type flexibility is almost unlimited. You can reverse, condense and expand fonts, adjust leading and

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NEW ON THE MENU

RUMOR MANAGER

The entire rumor-managing department of a sister magazine was replaced in one fell swoop last fall. Their downfall wasn't that they were getting too close to the truth or even that they were straying too far. They just let their internal bickering get out of control and very visible. So they were replaced.

We'd never let that happen to us. By the way, that's only a rumor.

Now that you can buy a an LCD printer that has laser-quality quality, far quicker performance, and a lower price, are you satisfied? You shouldn't be. The Casio folks, who are the actual developers of the LCD shutter printer engine that is the guts of the Jasmine/Qume printer, have just gotten started. They should soon be ready to show a 1,000-dot-per-inch (dpi) engine that combines LCD shutter technology with some major advances in precious-metal microgrid technology. The new engine will be as fast as the current LCD shutter engines (which is to say very fast) and should be available in sample quantities by the time you read this.

The modular software trend recently introduced by Silicon Beach Software (SuperPaint) and Select Micro Systems (Exstatix) is about to spread like wildfire.

Two more major publishers will announce modular products just about by the time you read this. And at least a dozen other publishers, both large and small, are looking into the technology. This certainly looks like the bandwagon to jump on.

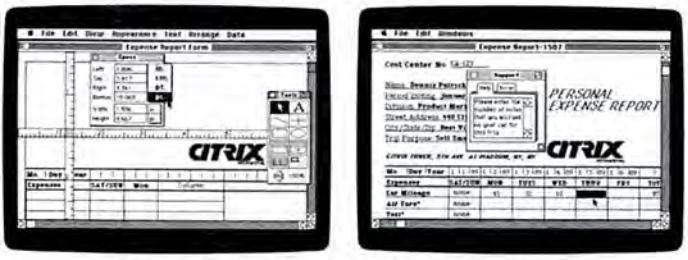
The recent software quality control problems that have, umm, afflicted Apple appear to have been solved. No heads rolled, although the problems are blamed for a reorganization or two, and several of the recent group office moves. Anyway, the rather innovative new Apple testing programs (those involved already know the details) should prevent a recurrence of the problems. Now if only Microsoft looks at Apple's solution and takes notice.

Apple is considering a new series of hardware upgrades. No surprises there. However, do look for a late surprise: a Plus-to-SE upgrade, complete with a 20-megabyte hard disk (there are lots of leftovers) and 2 megabytes of RAM (but in 256K SIMMs). Price? Probably $899. Why? Large corporate customers tend to have lots of Pluses, and they're calling in some markers to keep their machines from falling too far behind the leading edge.

Color XCMDs for HyperCard will appear in reasonable quantity in 1989. But they won't be too spectacular, as Bill Atkinson isn't committed to color in HyperCard yet.

One of the fastest-growing segments in the Mac marketplace is computer-aided design and manufacturing (CAD and CAM). New programs by yet another French company and two very large California-based companies will help keep things boiling. And some soon-to-be-announced CRT technology breakthroughs will involve not only picture quality, as you'd correctly expect, but also physical dimensions (greatly reduced depth)

takes many forms.



The SmartForm system lets you design professional-quality business forms on a Macintosh. Then lets anyone with a Macintosh fill them in.

customize type sizes from 4 to 127 points.

You can create sophisticated graphics and logos right in the program. Or copy art from other programs and paste it into your forms.

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In fact, you can do everything on a Macintosh that a professional forms designer does on a drafting table. Only faster, easier and without paper cuts.

But you won't have to redraw the forms you're currently using. Just scan them in.

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Then, SmartForm Assistant™ lets everyone else in your company fill in your forms on a Macintosh. Quickly and accurately. But it won't let anyone tamper with your designs.

With the SmartForm system, all your forms are stored on a Macintosh. You don't print a copy until you've filled one out.

That can save you a bundle in shipping and storage costs. And when you move to a more prestigious address, the price of success won't include thousands of dollars' worth of outdated forms.

Finally, SmartForm will integrate with your other Macintosh software. So you can easily transfer information from forms to spreadsheets or databases.

If all this sounds like great form to you, call 800-3CLARIS, ext. 500, for more details. And learn how you can turn a paper loss into a real gain.

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CLARIFICATIONS

Obfuscations obviated, ambiguities arbitrated, and errors eradicated.

and weight (much, much lighter). Who's responsible? Well, it isn't Sony, Mitsubishi, or Toshiba.

We recently saw a program that we don't hold out much hope for. It's called Boss, and it's supposed to be a very advanced personal time manager (PTM). But the version we saw gave us so much grief and was so persistently unfriendly that Nag would be a better, and certainly more accurate, name for the program. We hope that you never run across it.

On a more positive note, Apple's new Customer Satisfaction Group has proven to be such a success that at least three (and very possibly more) large software publishers have formed similar groups. Virtually every hardware and software company involved in the Mac market is thinking about forming such a group. It looks like Apple's little push is about to turn into a very large snowball. And that's great.

Have you heard any good rumors recently? Started any yourself that you'd like to take credit for? Can you share your "knowledge" with us? Does your legal department agree? Will you share anyway? If we use your rumor, we'll send you a token of our appreciation and promise not to use your name. Anonymous contributions are also accepted.

Our mailing address is Rumor Manager, c/o *MacUser*, 950 Tower Lane, 18th floor, Foster City, CA 94404. Our electronic addresses are *MacUser* (on MCI Mail), 72257,2671 (on CompuServe), and X0259 (on AppleLink). No calls please — the Rumor Manager has an unlisted number and much prefers it that way.

ATTRIBUTION, PLEASE

In the December '88 feature "Information, Please," the following attribution for the material on page 97 was inadvertently omitted: Graphs from the book *Culture Made Stupid* by Tom Weller, published by Houghton Mifflin Company, Boston. Copyright © 1987 by Thomas W. Weller. Reprinted by permission.

CUTTING THE CORD

The November '88 Quick Click on SoftPC included the misleading implication that SoftPC requires a serial connection between a Mac and a PC. Actually, SoftPC can access data on any existing Mac network or hard disk, and it enables a DaynaFile drive to be designated Drive A, as some PC software requires.

GIVE 'EM FIVE

In the November '88 review of Quicken (Quick Clicks), the program should have been given our highest rating: five mice.

ONE RING-A-DING

The October '88 installment of Flash Cards listed an incorrect telephone number for a stack called MacPersonal Class. The correct number to call for further information is (408) 980-7488.

"... the clear leader 4th DIMENSION..."

MacUser



"Although this category, unlike spreadsheets and word processors, had a lot of new players this year, one seemed to us to be the clear leader.
4th Dimension, the powerful first product from ACIUS, takes the kudos."
MacUser, February 1988

"Congratulations! InfoWorld's readers have chosen 4th Dimension as the Product of the Year in the Macintosh Database Systems category."
Jonathan Sacks, InfoWorld, April 1988

"I can't imagine a data-management problem that you won't be able to solve with 4th Dimension."
Steve Mann, Macintosh Today August 11, 1987

"Users with no experience or interest in programming can build a barebones database in 4D's 'Design Environment' just by pointing, clicking, and naming files and fields."
"For searches and sorts - database operations that are performed interactively - 4D's performance curve is probably the best of the four programs (Omnis 3 Plus, Double Helix II, dBASE Mac, and 4th Dimension)."
David Brandt, MacWEEK, January 19, 1988

"It will do everything you need, and then some, and will prove itself well worth the cost."
Jan L. Harrington, MacUser, November 1987

"I'm convinced that many users of other Mac databases and even PC databases will want to switch over to 4th Dimension."
Adam Green, Macworld, July 1987

"In general, Macintosh software is better than software for other personal computers...
4th Dimension redefines those high standards."
Andrew Gore, The Macintosh Buyer's Guide, Spring 1988

"4th Dimension from ACIUS, Inc. of Cupertino, California, outshines the other databases we tested both in number of features and in rich database development environment."
Don Crabb, InfoWorld, January 11, 1988

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CONTROL PANEL

What's in a Name?

Can you say *hacker?* Suuurrre you can! But do you know what you mean? CBS News thinks they do. So do the attendees of Hackers Conference 4.0. Unfortunately, about the only thing their definitions have in common with each other is that computers are involved. It's sometimes difficult for us to remember that not everyone in the world (or even in California) is a computer fiend (or even a computer user). The Mac community in particular is prone to this kind of amnesia. (It is not unique to computer people; I know a number of actors, for example, who can't believe that not everyone doesn't at least want to act.) Sometimes this just makes us bad conversationalists at cocktail parties. Sometimes it boomerangs in a less-than-pleasant manner.



Remember when *hacker* was a favorite with writers of sensational headlines? Remember when it was associated with inadvertently starting World War III — or advertently cleaning out someone else's bank account? Bet you thought that those days were over, right?

The Hacker's Conference found out the hard way that vocabulary changes more slowly out there in the real world — and that there are always media people to take advantage of the resulting ambiguity. The lesson came via CBS News, which ought to have known better. In fact, they probably do know better; it's just that good guys make bad news.

The Hacker's Conference rarely lets press in on their gatherings, but this past October they made an exception for a CBS camera crew. I don't know how much film they ended up with, but about a minute of it appeared in the actual report. It consisted of panning shots of people standing in line and talking, with the usual unctuous voice-over.

Without any segue or reason — except the continued use of the word *hacker* — the report moved on to several very serious gentlemen talking about people breaking into sensitive military computers and generally undermining the American way. One of them demonstrated a certain amount of talent with a yo-yo.

I have two things to say about this: One, I'm sure there are still a few computer whizzes whose idea of fun is to break security codes. But I think this says more about shoddy procedures on the breakee's side than it says about the sociopathic tendencies of computer users. Two, I am prepared to guarantee that none of the attendees at the Hackers Conference 4.0 are among this group. CBS cannot claim ignorance as defense; they are a news organization, and it's their responsibility to find these things out.

The hackers at the conference were not precocious kids who want to play war games. They are the core of innovative, talented, often brilliant computer experts who drive new hardware and software technologies. You'd recognize almost every name there. Some of them are written inside the Macintosh case. A lot of them appear on your screen every day on the title screens of telecommunications software such as MicroPhone II, or utilities such as QuicKeys. A few more appear on the covers of your sci-fi collection.

There's a warning here for all of us who make a living, one way or another, with technology. We get so wrapped up in what we're doing that we forget that it is incomprehensible or irrelevant to much of the rest of the world. The ongoing battle between the Macintosh and MS-DOS, for example, is not of general interest. Most people are still not comfortable with computer technology, and news coverage reflects that to a large degree. Computers that fail, computer users who break the law — *that's* news. The good news will be reported only when it is perceived to be too good to ignore. News like that comes from people like hackers.

A Broadside View

Having a monthly column has been a goal of mine for some time. And while I am delighted to be here, thank you, the process of getting started is fraught with problems I had not foreseen. I expected to run into the universal problem of "Arrrggghhh! What do I have to say *this* month?" I expected to start seeing deadlines in my sleep. (After editing the columnists for *MacUser* for over two years, I have the world's most imaginative list of excuses. The best, however, came when I worked for *Electronic Fun.* A writer called to tell me his material would be late because the daisywheel on his Coleco Adam printer melted in the sun.)

What I didn't expect was difficulty with the peripheral stuff — for example, the picture and the column title. The first title I came up with was "A View from a Broad." My male colleagues, in an unprecedented show of

We get so wrapped up in what we're doing that we forget it's incomprehensible to much of the rest of the world.



By Louise Kohl

Are You Still Naked?

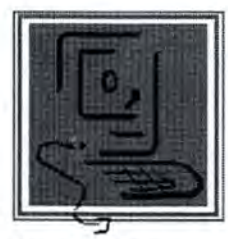
If you're not using ***The NightWatch*** & ***MacSafe*** to protect your hard disk files, you're leaving your work naked. Anyone with access to your Macintosh can browse freely through your files — even changing them without your knowledge, or innocently leaving a virus behind. And it could be tonight!

With ***The NightWatch,*** you can shut down your hard disk securely. ***The NightWatch*** stands guard, preventing unauthorized access or erasure of your hard disk. To unlock your hard disk, start up with a ***NightWatch*** user disk & enter your name and password. A simple & elegant security solution.



The NightWatch™

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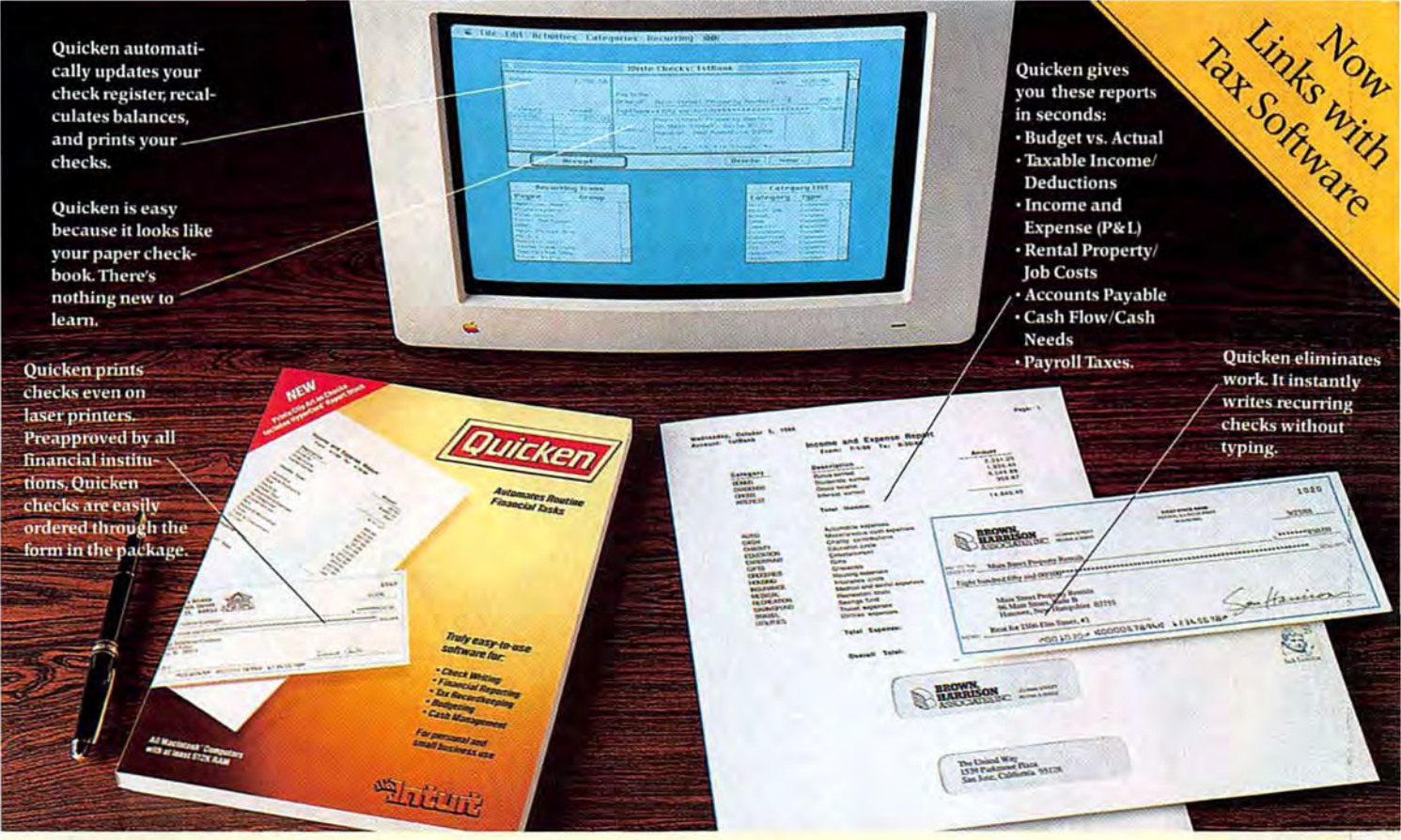
heightened consciousness, informed me that the column name was sexist. After a number of other suggestions, ("Put Mac in the title." "OK, how about 'Danse MA-Cabre'?"), we came up with one we could all live with (see above). OK, so it puts me in mind of JC Penney's lingerie department; at least it's not — God forbid — sexist.

The picture was a humbling lesson in vanity. Peter Gould, our staff photographer, is very good, but he just can't seem

The first title I came up with was "A View from a Broad." My male colleagues, in an unprecedented show of heightened consciousness, informed me that the column name was sexist.

to make me look tall, blond, and 25. You have to choose the shot carefully when you know your parents might show the thing to everyone in the Central Florida area. (And, of course, there's always that secret wish that my high school classmates will see this and eat their hearts out.)

So, in an attempt to generate letters to the editor as well as to poll readers, I'd like to hear comments on column names; any column names, any column. Please send your suggestions to What's in a Name, c/o Louise Kohl, *MacUser*, 950 Tower Lane, 18th floor, Foster City, CA 94404.



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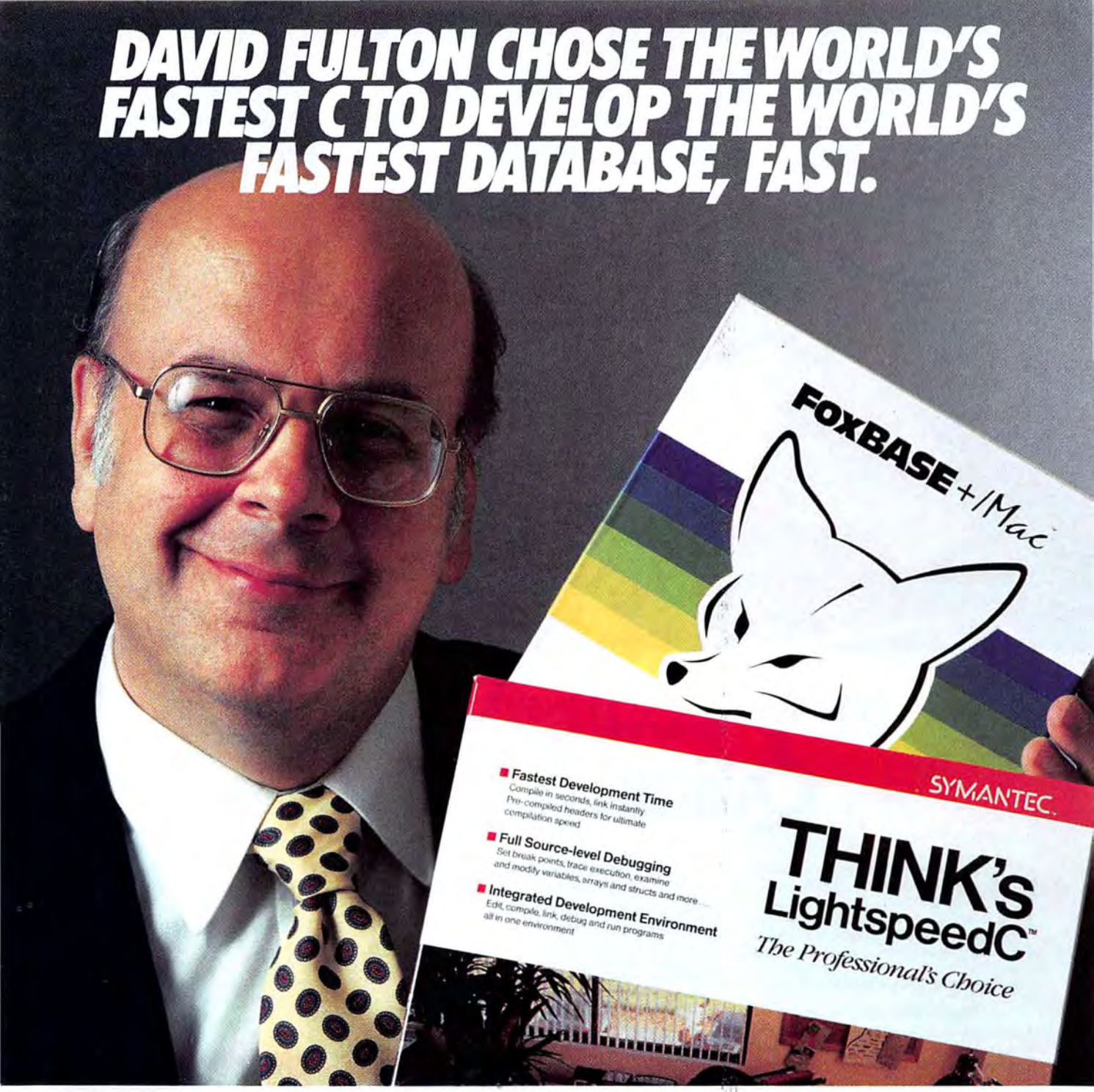
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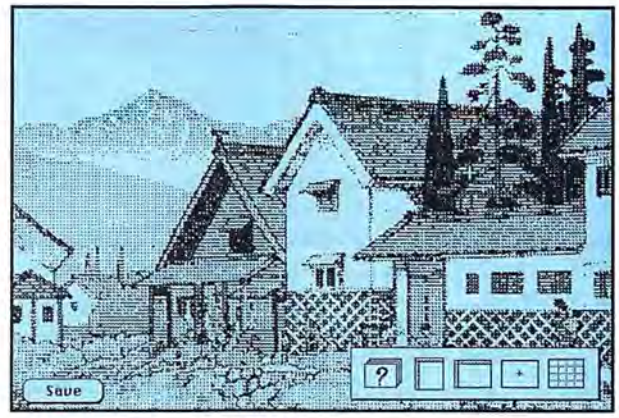
HARDWARE

Apple Scanner

Not all scanners are created equal. They may all look similar and generally do the same things, but the physical package often hides some big differences. If your scanner experience has been limited to watching a slick demo or two, then the Apple Scanner is likely to be a real treat. It's a snap to set up, and the basic software is simple and intuitive — two attributes that don't necessarily go together.

But for a 4-bit (16-gray-tone) monochrome scanner, it's not cheap. And technically, it's very much a "me too" scanner — not the state-of-the-art unit that we've come to expect from Apple. In fact, it's so far from the cutting edge that Apple usually aims for and often achieves that you almost wonder if it's a real Apple product.

The software is most suited for scanner neophytes. It's simple to use but is limited in both speed and capability. If you've used a scanner before, particularly one of the better units by Microtek or DEST, the Apple Scanner (with its AppleScan and HyperScan software) won't be anything special.



Shown is a Japanese wood block print scanned into HyperScan. All the controls needed, including on-line help, are in the menu bar at the lower right: the help icon, a vertical mode selector, a horizontal mode selector, a contrast and brightness control tool, and the halftone effects card.

Physical setup is simply a matter of attaching the scanner to the SCSI port and dragging a file into your System folder. Apple doesn't provide either a cable or a terminator with the Apple Scanner, so be sure to get the correct connectors. The manual has excellent instructions on what cables are needed in what situations and when and where terminators are required. Since the Apple Scanner doesn't have built-in terminating resistors as many external hard disks do these days, it's often easier to put the Apple Scanner somewhere in the middle of a SCSI chain. That way you won't require a separate SCSI terminator.

The actual hardware is very conventional. It produces gray-scale images with up to 16 levels. That's often not enough, as the average person's eyes can distinguish about 50 levels of gray. The better scanners on the market can produce gray-scale images with 64 and sometimes even 256 levels. If your ultimate output device is a 216-dpi (dots per inch) fax device or a 300-dpi LCD shutter or laser printer, then a total of 16 levels of gray is sufficient. But it's inadequate for professional work that is to be printed on Linotronic-type (1,270-dpi and up) printers. Even the 216-dpi output of the ImageWriter LQ wasn't very good (and was plagued by the "normal" dot-matrix–printer striping effect in black and very dark areas).

The software comes in three parts: AppleScan, HyperScan, and a Guided Tour (each on its own disk). Unless you're a newcomer to the Mac, just dive into AppleScan and try things out.

HyperScan is a stack written by Bill Atkinson that lets you scan and enhance images and then place them on HyperCard cards. It's pretty impressive stuff, but the final results are severely limited by HyperCard's environment. Image size is restricted to the standard card size rather than the actual page size the hardware is capable of, and images can't use gray scales at all (2-bit black-and-white bit maps are all HyperCard currently supports). While HyperScan's effects are very impressive, you'll want to use HyperScan only when the final destination of your image is a HyperCard stack. All other work will involve AppleScan.

The AppleScan software is fairly simple and straightforward. It has many nice, easy-to-use touches built

The 5-Mouse Rating

🖱🖱🖱🖱🖱	EXCELLENT
🖱🖱🖱🖱	VERY GOOD
🖱🖱🖱	GOOD
🖱🖱	FAIR
🖱	POOR
💣	DOESN'T WORK

in. The first step is always the Preview scan. This is a quick test scan that you use to adjust the controls. To start, select any of three scanning modes: line art, halftone, and gray scale. Then preview the image.

The next step is to fine-tune the image. This is exceptionally easy since you can try many combinations of threshold, contrast, and brightness to see which produces the best final image.

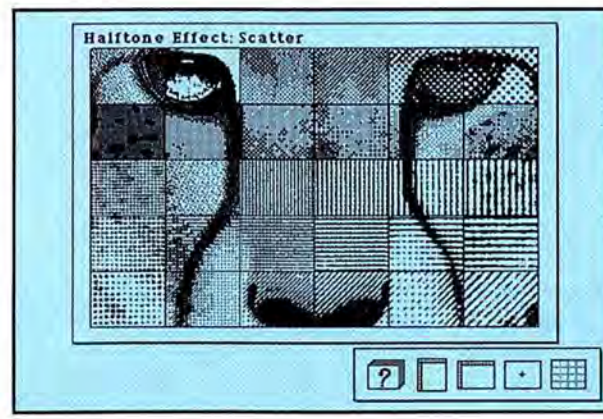
Screen updates showing your changes take less time than would a full rescan, since only a small area must be modified. The controls show both the current settings and the previous settings (in a dotted outline), thus making it easy to go back if a change is for the worse rather than the better.

The software can also generate test prints, with the center strip of an image showing the actual settings, and the portions above and below the center displaying the settings one step away in either direction. This way, you can see if any adjustments need to be made. In Preview you can save only your settings, not the actual image.

Once you've decided on the optimal settings, you actually scan the image. This takes considerably longer than a preview, but even at its slowest it takes less than a minute. The scanned image comes up in a document window, generally under the various control panel and palette windows.

One minor AppleScan problem is that it is sometimes difficult to remember which window to activate to allow a particular operation. Since each control panel and palette is actually a window, creating and manipulating images often involves a lot of switching around.

When the image is scanned, you can use AppleScan's fairly limited Tools menu, or you can save the image in a format readable by a more advanced program. If you have advanced graphics-manipulation software, you're much better off doing your work there rather than in AppleScan, which is really suitable for only the smallest touch-up jobs. Images can be saved in PICT, TIFF, or MacPaint format. AppleScan can open only PICT documents, but that's not too much of a drawback unless you have no other image-manipulation software.



In HyperScan's halftone effects card, click on any segment and then click on the rightmost icon, and that effect will be applied to your full scan.

AppleScan's greatest weakness is its speed. It's slow; there's no kinder term to describe its pace. And if you try to use its drawing tools on a large scan, it's also imprecise. In its Fatbits and Chubbybits (smaller than Fatbits but big enough to pick out pixels) modes, I sometimes had trouble getting exactly the point I wanted to modify. That seemed to be the result of a slight control delay.

Another problem is AppleScan's propensity for creating temporary files that do not always close properly. Such files, which may be large, can't be thrown away until after the application is restarted. This appears to be a rather intractable problem, as the File menu has a command called Restart AppleScan.

The Apple Scanner handles line art about as well as most scanners. Since you can easily optimize the scanning parameters, images that require minimal cleanup can be created quickly and easily.

The Apple Scanner is also very good on halftones, especially those that are intended for output on 300-dpi devices. It handles these very well. When creating halftone images, you have a choice of several halftone patterns. If none of them works, you can create your own.

Where the Apple Scanner falters slightly is on gray-scale images. These days, 4 bits (16 levels of gray) just isn't enough. Apple-Scanned images suffer by comparison with any 64-gray-level images. Also, the software has no gray-scale-editing ability whatsoever.

The manual is excellent — one of Apple's best in a long time. The tutorial is well done, and the rest of the manual maintains this high standard.

Overall, the Apple Scanner is a good deal for light-duty use. A few dollars more will buy a lot more scanning power, but at considerable cost in ease of use. If you scan regularly but not often enough to justify one of the heavy-duty units with 64 or 256 gray levels, or if user convenience is a paramount consideration, the Apple Scanner is for you.

— *Steven Bobker*

Apple Scanner

★★★½



List Price: $1,799
Manufactured by: Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014; (408) 996-1010.
Software version: 1.0
Requires: System Software 6.0 or later; hard-disk drive needed for full-page work; SCSI connection cable(s) and SCSI terminator (if at the end of a chain); HyperScan requires HyperCard 1.2 or later.
Compatibility: Mac II and MultiFinder friendly.
Hardware Size: 13.6 inches wide by 21.8 inches deep by 4.4 inches high; 20 pounds.
Application Size: AppleScan, 267K plus 2K Preferences file; HyperScan, 112K plus HyperCard.
Copy Protection: None

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HARDWARE

DATA•PAK



The drive mechanism, made by Syquest, is very fast (less than 25 milliseconds access time) in addition to being sturdy. The cartridges are not much larger than a 5.25-inch floppy disk.

The MASS MICRO DATA•PAK is a mixed blessing. The 45-megabyte removable Winchester hard disk may be the best of its class from a hardware perspective. Unfortunately, the utility software can easily allow you to format an internal hard disk. Software like this may be the strongest argument I've ever encountered for backing up.

The basic idea of the removable cartridge drive is excellent. On the hardware level, I have absolutely no complaints about its performance. The unit I have been using has worked reliably for over two months now, and I know several other people who are thoroughly satisfied with it.

If you want to use the 45-megabyte cartridges as oversized floppy disks, there's really nothing to it. Stuff a cartridge in the drive, and it appears on the desktop like any other disk. When you want to take it out, drag its icon to the trash, push the eject button on the drive unit, and wait for the red light to go off. Simple. It won't even let you eject a cartridge from the drive until you have trashed its icon on the desktop — a feature that I appreciate about 95 percent of the time and curse the other 5 percent.

It serves equally well as a backup device — a welcome change from backing up to a gazillion floppies — or as a "temporary" hard drive — allowing you to expand your storage capacity indefinitely at roughly $150 per 45 megabytes. If you simply must have more storage, several other configurations are available: It comes in two-cartridge and one-cartridge/one-fixed-hard-disk combinations of 40, 80, and 120 megabytes.

The manual, however, is poorly organized, not thorough, and sometimes confusing. For example, no distinction is ever made between the PAD•LOK chooser file (named PAD•LOK) and the PAD•LOK utility, named, appropriately, PAD•LOK utility. In fact, the manual consistently refers to the utility simply as PAD•LOK. MASS MICRO says it is revising the manual for future releases of the product.

The PAD•LOK utility can be used to partition a cartridge into up to ten virtual hard disks, each of which can be separately password-protected. Volumes can then be mounted by selecting them from the Chooser — a handy feature. Other PAD•LOK functions include testing the drive, installing new drivers, and changing partition passwords.

PAD•LOK has one serious flaw. Some drives might be placed in danger when you are formatting the DATA•PAK. The dialog stating "Do you really want to format the drive? This will destroy all existing data." is *not* an adequate warning. Why? Because a question remains: Which drive is "the drive" that the dialog box is warning you about? Any utility that can scan the SCSI bus, update boot blocks with new drivers, and format and partition hard disks should be able to tell you the *name* of the hard disk it's about to deep-six. (MASS MICRO says it will fix the problem in a future release of its software.) Even knowing the SCSI bus ID numbers of your drives — a very Mac-like thing to keep track of, right? — won't necessarily save you. PAD•LOK rescans the SCSI bus after each activity it performs and, without warning, automatically resets the selected device to the lowest number it finds. In my case, that was my internal drive. Even though I had carefully selected device 4 (my DATA•PAK) before doing a drive test, PAD•LOK switched to device 2 (my internal drive) when it finished the test. My next activity was to format "the drive." It wasn't a pretty sight.

You're probably wondering about speed. I didn't run any benchmarks, but I have some subjective ideas. I noticed a consistent sluggishness when the Finder reads the directory of a newly inserted cartridge. But for normal operation, it seemed to keep up with both my internal and external SCSI drives.

With all the negatives I have mentioned, you might think I have a low opinion of this product. Quite the contrary.

I recommend the DATA•PAK highly to anyone short of storage space and tired of backing up on floppies (which is most of us). In fact, with a little work, this could be a five-mouser. Most people won't ever need to even open the PAD•LOK utility. But considering that it wiped my internal drive twice (yes, twice — some people learn slowly) and given the poor state of the manual, it's not ready to compete for top scores.

— *Henry Bortman*

DATA•PAK



List Price: drive, $1,799.95; cartridges, $149.95 each or tri-pack for $419.95.
Manufactured by: MASS MICRO Systems, Inc., 550 Del Rey Ave., Sunnyvale, CA 94086-3258; (408) 522-1200, (800) 522-7979.
Requires: SCSI connector and System 4.1, 5.5, or later.

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–Thomas L. Massie MASS microsystems founder MACWEEK, Jan. 26, 1988



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COMMUNICATIONS

FAXstf Modem

There are times when transferring information by modem just doesn't cut it. Unfortunately, not everyone uses a computer as a vital part of everyday business. One solution, of course, is to fax your documents and to have non-Mac documents faxed to you. In truth, fax machines are a pretty good solution to a lot of common business problems: They send hard copy over the phone lines at a fraction of the cost of overnight mail. Several good fax machines are now priced at less than $1,000.

Recently, a new computer-hardware category has emerged: the fax modem. Fax modems enable you to send Mac-generated documents to standard fax machines and, in turn, to use your Mac to receive documents from fax machines. STF Technologies recently introduced one of the first fax modems for the Mac, the FAXstf Modem.

The FAXstf is sleek and smaller than most modems. Hardware installation is simple: You connect it to your Mac just as you would a modem. Software installation, though, is more complicated. You have to run a gauntlet of dialog boxes before the software knows where to store incoming and outgoing fax documents. Although the manual is far from a model of clarity or brevity, it does guide you through this installation.

Once everything is in place, sending faxes with the FAXstf is straightforward. With the FAXstf selected as your output device in the Chooser, you just print documents. After the print driver spools your fax to the fax folder, a dialog box lets you choose the destination and time to send the fax. If you're a MultiFinder user and you're running the FaxMonitor application, the fax will automatically be sent at the proper time. If you're not a MultiFinder user, then you'll have to open either the FaxMonitor or the FaxManager application to send your document.

Receiving a fax from another machine is even easier. If FaxMonitor is running in the background under MultiFinder, then FaxMonitor will automatically come to the foreground to receive and store the document. If you're not using MultiFinder, however, you'll have to be in either FaxMonitor or FaxManager.



The FAXstf Modem is sleek and smaller than most modems, though not as fast as most dedicated fax machines.

There's no option to print incoming documents automatically. In fact, you have to view documents on the screen before you can print them. Viewing and printing documents can be time-consuming. Currently, no way exists to translate incoming documents into native Mac file formats like TIFF or PICT, so analysis with an optical-character-recognition program or manipulation with a graphics program is impossible. Basically, the only thing you can do with an incoming document is view it or print it. Printed output from a laser printer, however, is far superior to the usual product from regular fax machines.

In tests with several brands of fax machines, the FAXstf reliably sent and received a number of multipage documents. Image quality was at least commensurate with that of normal fax machines.

The FAXstf is slower than most fax machines; its maximum speed is 4,800 baud. Most fax machines and other fax modems, including Apple's, communicate at a top speed of 9,600 baud. The FAXstf adheres to Group III fax specifications, but many manufacturers deviate from this standard to one degree or another, so compatibility may be a problem. Some users have reported problems communicating with certain brands of fax machines, so you may want to check with STF Technologies if you intend to communicate with one particular machine.

The FAXstf makes it difficult to alternate using the fax modem and a regular modem. Some fax modems perform double duty as a regular modem, or they at least provide a pass-through port with a switch to alternate between devices. Each time you want to switch between a FAXstf and a regular modem, though, you have to change plugs at the back of your Mac. This is a serious drawback for anyone with regular telecommunications requirements as well as fax requirements on the same machine.

If you absolutely require fax capabilities on your Mac, the FAXstf might be a worthwhile purchase, although you should investigate Apple's own fax modem as well as products from other vendors. If, however, you don't have an immediate need for a fax modem, you might do well to wait. The FAXstf, and especially its software, appear to have been rushed to market. Since this field is evolving rapidly, both this product and others like it are sure to improve significantly soon.

— Larry Husten

FAXstf Modem

$$$



List Price: $695
Marketed by: STF Technologies, P.O. Box 247, Higginsville, MO 64037; (800) 426-1679; in Missouri (816) 584-7727.
Version: 1.03
Requires: 1 megabyte; hard-disk drive strongly recommended.
Compatibility: Mac II and MultiFinder friendly.
Application Size: FaxMonitor, 58K; FaxManager, 125K; FaxPrint, 66K.
Copy Protection: None

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Stepping Out II ..... 52.
Beyond, Inc.
MenuFonts 2 ..... 30.
CE Software
DiskTop 3.0.2 ..... 27.
QuicKeys *(new macro programmer)* 53.
Central Point
Copy II Mac *(with MacTools)* ..... 20.
PC Tools Deluxe For Mac ..... 40.
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Lasertalk 1.0 ..... 187.
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Suitcase 2.0 ..... 44.
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Capture ..... 42.
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MultiClip ..... 36.
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Simon and Schuster
Fully Powered Mac ..... 24.
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PowerOP 1.4 ..... 39.
SuperMac
DiskFit or SuperSpool 5.0 ..... ea 54.
Sentinal 2.0 ..... 155.
SuperLaserSpool 2.0 ..... 82.
Symantec Corporation
Symantec Utilities for Macintosh ..... 59.

Talking Tiles (Bright Star)
Bright Star brings computer-aided learning to life with an interactive, animated talking tutor complete with real speech sounds synchronized with correct facial movements. With Talking Tiles, you'll see and hear how letter sounds are combined to form words using educationally sound teaching methods. *(education)* **$69.**





MaraThon SP (Dove)
The MaraThon Serial/Parallel (SP) is an industry standard expansion card that extends the capabilities of the Macintosh II, giving users access to peripherals that offer better of faster features. The MaraThon SP provides one RS-232-C Standard serial port, accessed through an IBM-style DB9 connector, and one Centronics parallel port, accessed through a DB25 connector. Both hardware and software installation are fast and simple. *(disk drives)* **$189.**

DESK ACCESSORIES

Affinity
AffiniFile ..... 46.



P51 Mustang Flight Simulator (Bullseye Software)
Fly the P51 — Cadillac of the sky. An incredible adventure in the skies over England and France in WWII. You'll dogfight ME109's, strafe ground targets — even buzz the Eiffel Tower. Just like the movies. Fly against another Mac via modem. View action replay from13 different angles. *(entertainment)* **$32.**

"Ferrari Grand Prix" Chosen 1987 "Simulation game" of the year. Formula One racing simulation . . . challenging, exciting. *(entertainment)* **$32.**

Allan Bonadio Associates
Expressionist 2.0 (equation edtr) ..... 79.
Borland
Sidekick 2.0 ..... 65.
Cassady & Greene
QuickDEX ..... 32.
Exodus Software
Retriever ..... 59.
Solutions
SmartScrap & The Clipper ..... 35.
TENpointO
Open IT! ..... 49.

LANGUAGES

Borland
Turbo Pascal ..... 65.
Turbo Database Mac ..... 65.
Manx Software Systems
Aztec C or Unitools ..... ea. 65.
Aztec C+SDB ..... 99.
Aztec c+MPW ..... 99.
Microsoft
Basic Interpreter 3.0 ..... 62.
QuickBasic ..... 65.
SmethersBarnes
Prototyper ..... 72.
Symantec
CAPP's Lightspeed C or Pascal ..... 49.
Lightspeed C 3.0 ..... 95.
Lightspeed Pascal ..... 65.

Zedcor
ZBasic 5.0 1

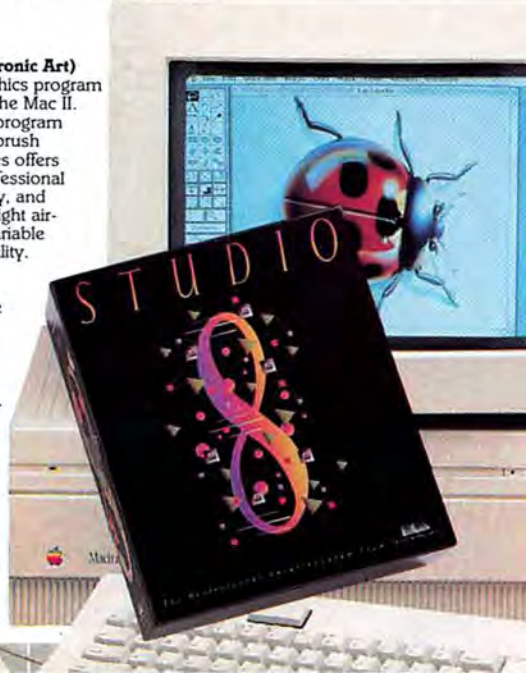
COMMUNICATIONS

CE Software
QuickMail 1
CompuServe
CompuServe Navigator 1
DataVIZ
MacLink Plus w/Cable 1
FreeSoft
Red Ryder 10.3 1
Hayes
Smartcom II *(communications)* 2
Software Ventures
Microphone II 2
SuperMac
Acknowledge 3
Traveling Software
LAP-LINK 1

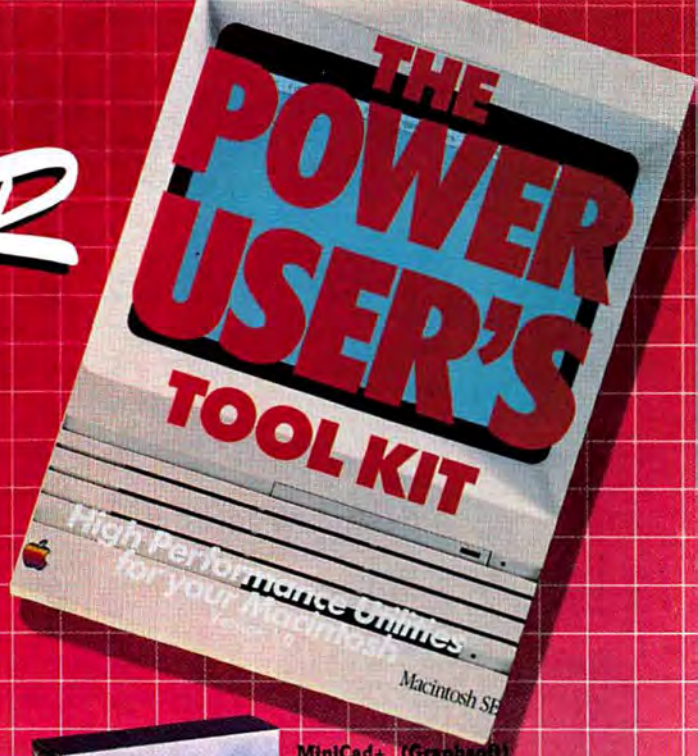
DATABASE SOFTWA

Acius
4th Dimension 4
Aston-Tate
dBase Mac 2
Borland
Reflex Plus 1
Claris
FileMaker II 2

Studio/8 (Electronic Art)
New color graphics program exclusively for the Mac II. This 256 color program with unlimited brush shapes and sizes offers the creative professional power, flexibility, and functionality. Eight air-brushes with variable flow add versatility. Extraordinary speed with one-step results. The Magnification Mode has four levels, and you can re-size and move windows. Studio/8 is simple, intuitive and powerful. *(graphics)* **$319.**



FREE OFFER



The MacWarehouse technical staff and the publishers of the popular Power User's Manual have put together a great new disk of utilities, desk accessories and applications. THE POWER USER'S TOOL KIT. Seventeen great programs including Raymond Lau's Stuffit. There's even a powerful word processor you can install as a desk accessory.



And here's the best part. The Power User's Tool Kit is free with any purchase from MacWarehouse. You pay only $1.50 for shipping and handling (if you want the disk). The programs are shareware, so you can try the software free of charge. If you wish to continue, some authors ask that you send them a small fee ($5 – $25). Some of the programs are absolutely free. All of the details are explained on the disk, which is yours to keep anyway.

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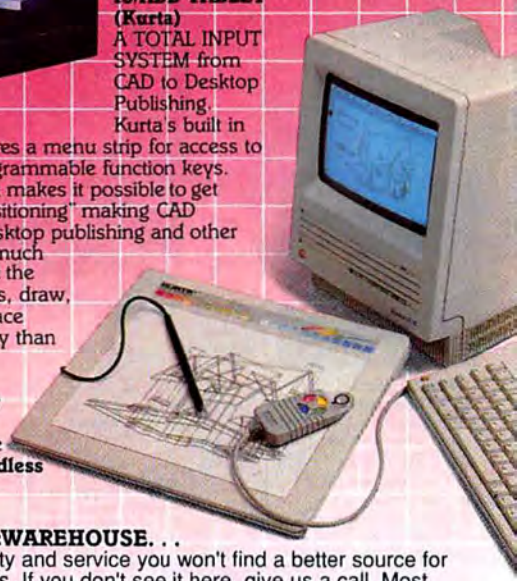
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Take a look at the MacWarehouse specials and call us with your order to receive your free catalog and THE POWER USER'S TOOL KIT.



MiniCad+ (GraphsoR)
MiniCad+ is a high precision, professional level CAD and Analysis program. The only CAD system on the Mac with integrated 2D & 3D & a dynamically linked spreadsheet in the same window. Advanced users can customize with programmable macros. *(cad/cam)* **$525.**

IS/ADB TABLET (Kurta)
A TOTAL INPUT SYSTEM from CAD to Desktop Publishing. Kurta's built in software features a menu strip for access to 11 to 23 programmable function keys. Using a tablet makes it possible to get "absolute positioning" making CAD drawings, desktop publishing and other applications much simpler. Move the screen cursors, draw, sketch and trace more precisely than with a mouse. *(input/output)* **$255.**
Also Available **4 Button Cordless Cursor $99.**



NEW 800K Drive (Cutting Edge)
The Cutting Edge 800K disk drive's attractive styling, quiet performance, and high-tech reliability makes it our most popular floppy drive. The drive uses ASIC technology to reduce the number of parts, increasing reliability and reducing weight. Features an LED light to indicate disk access and a hinged door over the disk insertion slot to keep the mechanism clean. Uses standard Apple formatting routines and supports the Macintosh's standard software eject features. Features manual eject mechanism also. One year warranty. *(disk drives)* **$175.**



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MacEqn
Allows you to typeset complex mathematical equations. Supports integrals, sums, products, roots, matrices, and much more. MacEqn offers a programmable symbol palette and adjusts format and sizing automatically. *(statistical)* **$24.**



Double Helix II MultiUser Kit
The MultiUser Kit is the ideal way to share database solutions with others. Standard features include simple installation, LocalTalk, compatibility, immediate network updating, record-locking, network protection — and no additional fileserving or hardware is required! *(database)* **Call.**



NoteWriter
A music publishing program offering a variety of powerful input methods. The graphic oriented user interface, publishable quality output and EPS compatibility make this the ideal music publishing system! *(music)* **$169.**

Silicon Beach
Digital Darkroom or Super 3D ..... Call.
SuperPaint 2.0 ..... Call.
Solutions
Curator *(graphics management)* ..... 79.
SuperMac
PixelPaint 2.0 ..... Call.
Symmetry
PictureBase 1.2 ..... 58.
T/Maker
ClickArt Business or Publications ..... 28.
ClickArt EPS Illustrations ..... 75.
Zedcor
DeskPaint 2.0 ..... 69.

DESKTOP PUBLISHING PRODUCTS

Adobe
Ace-Textures, Fill, and Patterns ..... 168.
Illustrator 88 ..... 319.
Streamline ..... 295.
Aldus
PageMaker 3.0 ..... 399.
Broderbund
DTP Advisor ..... 49.
Letraset
Image Studio or Ready,Set,Go! 4 .. 279.
ReadySetShow ..... 189.
Olduvai
Read-It! 2.0 *(OCR)* ..... 199.
Quark
Xpress or QuarkSytle ..... Call.
Solutions
SuperGlue 1.05 ..... 52.
Springboard
Springboard Publisher ..... 109.
Target
Scoop ..... SPECIAL 189.

NETWORKING PRODUCTS

Connect Inc.
MacNet ..... 43.
Farallon
Timbuktu 2.0.1 ..... Call.
Nuvotech
TurboNET ..... 30.
SuperMac
Network DiskFit ..... 199.
TOPS
TOPS 2.0 ..... Call.

FONTS

Adobe
Fonts ..... Call.
Altsys
Fontastic Plus 2.0 ..... 54.
Olduvai
ArtFonts ..... 59.
Postcraft
Laser FX ..... 115.

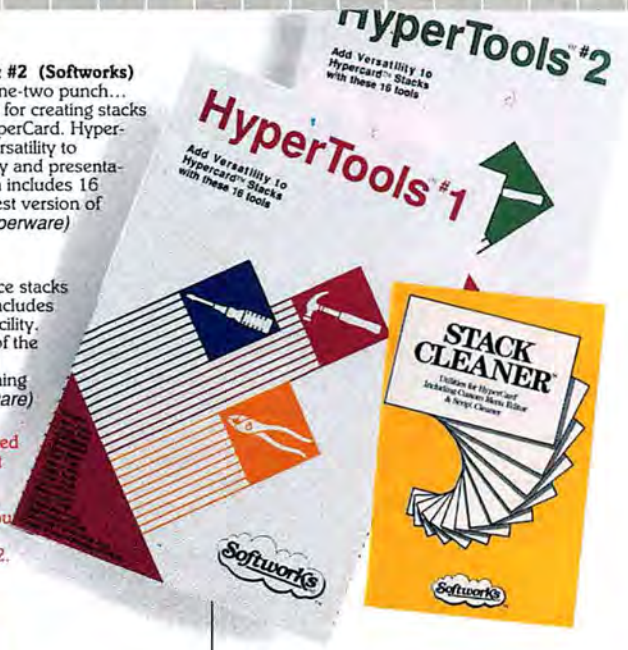
CAD/CAM

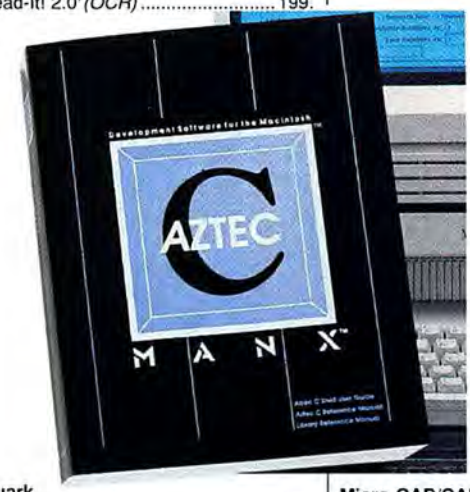
Graphsoft
MiniCad 4.0 ..... 375.
MiniCad Plus 525
Innovative Data
MacDraft 1.2a *(power drafting)* ..... 155.
Dreams ..... 319.

HyperTools #1 & #2 (Softworks)
Give stacks the one-two punch... HyperTools #1 is for creating stacks and scripts in HyperCard. HyperTools #2 adds versatility to stackware in entry and presentation of data. Each includes 16 tools plus the latest version of HyperCard. *(hyperware)* **$65.** each.

Stack Cleaner
Utilities to enhance stacks for HyperCard. Includes menu creation facility. Performs many of the tasks needed for merging and cloning stacks. *(hyperware)* **$39.**

FREE For a limited time only you get Stack Cleaner Free (a value of $49.95) when you purchase both HyperTools 1 & 2.





Aztec C (Manx Software)
Includes Aztec Shell Compiler, 6800 Macro Assembler, Overlay Linker, Librarian, Run Time Libraries, Profiler, Full Macintosh Toolbox Interface, and Portable C Library interface. *(language)* **$65.**

Micro CAD/CAM
MGMStation *(professional CAD)* .... Call.

FINANCIAL AND ACCOUNTING SOFTWARE

Aatrix
Payroll 3.01 ..... 99.
Payroll PLUS ..... 159.
Bedford
Simply Accounting ..... 219.
Intuit
Quicken ..... 33.
MECA
Managing Your Money ..... 128.
Monogram
Business Sense ..... 279.
Dollars & Sense ..... 81.
Softview
MacInTax Federal '88 ..... 69.
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MacMoney 3.02 ..... 62.

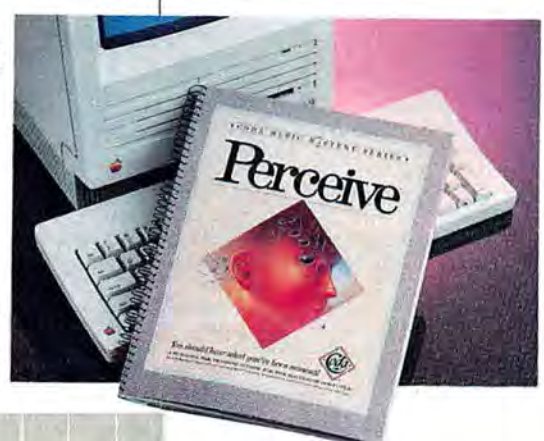
STATISTICAL ANALYSIS

Abacus Concepts
StatView II *(req. Mac II, or Plus/SE w/68881 co-processor)* ..... 369.
StatView SE+Graphics ..... 229.
BrainPower
StatView 512+ *(requires 512k)* ..... 175.
D2 Software
MacSpin 2.0 ..... 189.
Odesta
Data Desk Professional ..... 289.
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MUSIC AND SOUND

Coda
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Perceive ..... 52.
Electronic Arts
Deluxe Music Construction 2.0 ..... 61.
Farallon Computing
MacRecorder *(records sound)* ..... 139.
Great Wave
ConcertWare + MIDI 4.0 ..... 79.
Impulse
Audio Digitizer w/SoundWave ..... 149.
Intelligent Music
OvalTune ..... 95.
Opcode Systems
Music Mouse ..... 39.
Passport Designs
Master Tracks Pro ..... 259.
NoteWriter ..... 169.

Perceive (Coda Music Software)
The first interactive ear-training program on the Macintosh. Includes on-screen keyboard, workbook, textbook and MIDI compatibility. Ideal for home study and a natural for university and high school music departments. Starts at the easiest possible levels and grows in difficulty as you learn. Ability to design soundwaves with great precision and uses sophisticated music materials. *(music)* **$52.**

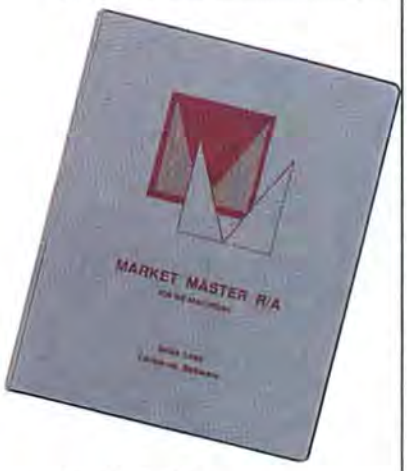


MORE FOR YOUR MONEY...

Fox Software
FoxBASE+/Mac ..... 209.
Odesta
Double Helix II ..... 349.
Double Helix II MultiUser Kit ..... Call.
GeoQuery ..... 299.
Park Row Incorporated
Publish or Perish ..... 21.
Personal Bibliographic
Pro-Cite ..... 199.
Software Discoveries
Record Holder Plus ..... 45.

BUSINESS SOFTWARE

Access Technology
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Full Impact ..... 249.
Bravo
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BreakThrough Productions
Market Master ..... 185.
Market Master R/A ..... 245.
Claris
MacProject II ..... 395.
Cognition Technology
MacSMARTS 3.2 ..... 135.
Cricket
Cricket Graph *(advanced graphing)* 119.
Cricket Presents ..... 289.
MicroPlanning International
MicroPlanner Plus ..... 445.



Market Master R/A (Breakthrough Productions)
Lets you sell like never before — never lose a lead — get much higher response rate. Doesn't just track leads, it handles them. You get letters that look personally typed, envelopes, labels, call lists and reports. Sends the right letter to the right person at the right time. Includes its own results analysis. Nothing ever falls through the cracks. *(business)* **$245.**

Microsoft
Excel 1.5 ..... 249.
PowerPoint 2.0 ..... Call.
Works 2.0 ..... 189.
Nolo Press
For the Record ..... 29.
WillMaker ..... 35.
North Edge Software
Timeslips III *(time/expense tracking)* 119.
Satori
Bulk Mailer 3.2 ..... 79.
Shana Enterprises
FastForms! Construction Kit ..... 89.
Softview
FormSet ..... 55.
MacInUse ..... 42.
Spectrum Digital
TrueForm ..... 269.
Symantec
More II ..... 235.

WORD PROCESSORS AND OUTLINERS

Ashton-Tate
FullWrite Professional ..... 269.



HyperAnimator (Bright Star)
Add life to your HyperCard stacks using animated images synchronized with sound. A breakthrough in animation technology — HyperAnimator lets you create lifelike talking images on screen. Combine the spirit of animation with the power of the Mac... for fun, entertainment education, and desktop presentations. *(hyperware)* **$79.**

Claris
MacWrite 5.0 ..... 105.
Microsoft
Word 4 *(updated word processor)* .. 249.
Write 1.0 *(new word processor)* ..... 113.
Niles & Associates
End Note ..... 85.
Paragon
Qued/M ..... 109.
Symmetry
Acta Advantage w/DA ..... 69.
T/Maker
WriteNow 2.0 *(word processor)* ..... 109.
WordPerfect Corp.
WordPerfect ..... 185.

SPELLING CHECKERS

Aegis
Doug Clapp's Word Tools ..... 42.
A.L.P.
MacProof 3.0 ..... 115.
Deneba Software
Bigthesaurus ..... 55.
Spelling Coach 3.0 ..... 54.
Spelling Coach Pro ..... 105.
Electronic Arts
Thunder *(spelling checker)* ..... 30.
Microlytics
Word Finder *(synonym finder)* ..... 33.
Sensible Software
Sensible Grammar ..... 54.
Working Software
Spellswell 2.0 *(spelling checker)* ..... 45.

GRAPHICS

3G Graphics
Images w/Impact
Graphics & Symbols 1 ..... 59.
Business 1 ..... 75.
Aba Software
Draw It Again Sam 2.0 ..... 79.
GraphistPaint II ..... 289.
Aldus
Freehand ..... 349.
Broderbund
Drawing Table ..... 79.
PosterMaker Plus ..... 36.
Print Shop *(cards and more)* ..... 36.
VideoWorks II ..... 175.
CE Software
CalendarMaker ..... 27.
Claris
MacDraw II 2.0 ..... 329.
MacPaint 2.0 ..... 105.
Cricket
Cricket Draw ..... 169.
Cricket Paint ..... **SPECIAL** ... 99.
Pict-O-Graph *(color on the Mac II)* .. 105.
Deneba
Canvas 2.0 ..... 169.
Dream Maker
Cliptures, Vol. 1 Business Images ... 97.
MacGallery ..... 28.
Electronic Arts
Studio/8 ..... 319.
MicroIllusions
Photon Paint ..... 179.
MicroMaps
MacAtlas Pro *(MacDraw format)* .... 129.
NuEquation
NuPaint ..... 89.
Olduvai
Art Clips ..... 69.

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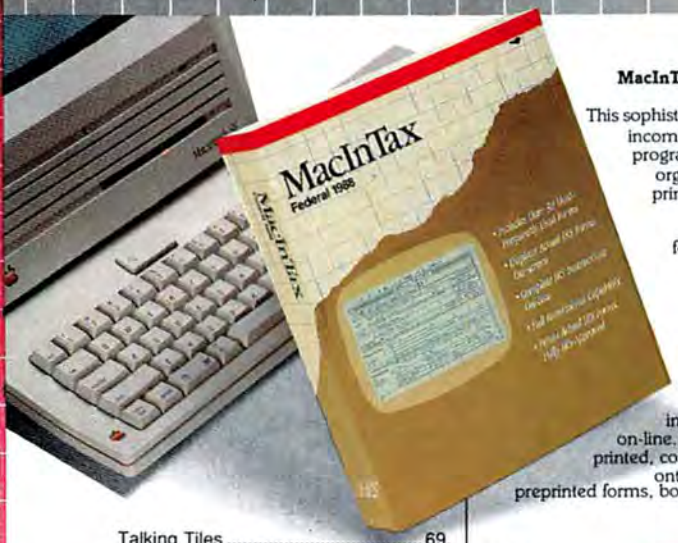
EADB-105 Keyboard
Features 105 keys to make using your Mac II or SE easier. 18 Key numeric keypad to speed up numerical data. 15 user-assignable function keys execute the commands you use most frequently. *(input/output)* **SPECIAL $99.**



Grappler LS
The latest Macintosh interface solution from Orange Micro. Connects the HP Deskjet or any HP compatible serial laser printer to the MacPlus, SE or II. Full 300 DPI resolution. Just set the switch and leave the driving to the Grappler LS, the highly intelligent printer interface. *(accessories).* **$92.**



OVERNIGHT ... ONLY $3.00



MacInTax Federal 1988 (Softview)
This sophisticated easy to use income tax preparation program allows you to organize, store, and print out income tax information. Includes 74 IRS forms, schedules, statements and worksheets. Links forms automatically to reduce input errors. Program features the IRS instruction booklet on-line. All forms can be printed, complete with data onto blank paper or preprinted forms, both IRS approved. *(finance)* **$69.**

Talking Tiles ..... 69.
Bootware Software
ResuméWriter Pro ..... 75.
Broderbund
Calculus, Geometry, Physics ..... ea.59.
Davidson
Math Blaster ..... 27.
Speed Reader II ..... 39.
Great Wave
Kids Time ..... 26.
Learning Company
Reader Rabbit ..... 33.
Mindscape
Perfect Score S.A.T. ..... 46.
Palantir
MacType ..... 31.
Simon & Schuster
Typing Tutor IV ..... 35.

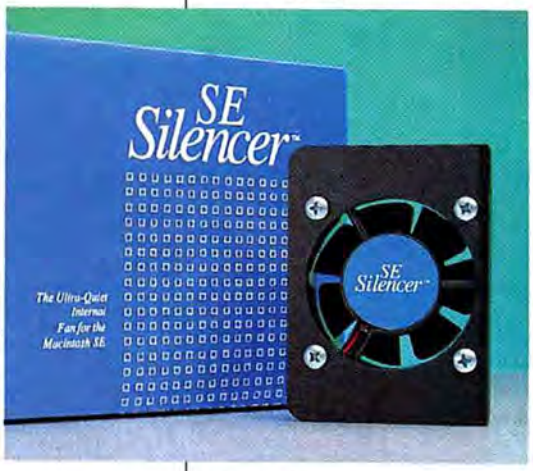
Go Master (Nemesis)
The ultimate strategic board game, Go is one of the oldest games in the world, originating in China more than 4,000 years ago. The rules are simple, yet the strategy is profound. Go Master is the only Go program to successfully imitate human play. *(entertainment)* **$49.**
Joseki Tutor To further advance your study of the ancient oriental game of Go. Joseki are opening game patterns considered locally optimal and equitable for both players. These Joseki have been worked out by masters over the centuries. *(entertainment)* **$30.**



GAMES

Artworx
BRIDGE 5.0 ..... 22.
GrailQuest ..... 19.
Broderbund
Ancient Art of War At Sea ..... 27.
Shufflepuck Cafe ..... 22.
Where in the World is Carmen San Diego ..... 25.
Bullseye
Ferrari Grand Prix *(racing)* ..... 32.
P51 Mustang ..... 32.
Casady & Greene
Crystal Quest II ..... 26.
Centron Software, Inc.
BlackJack Ace ..... 27.
Crapsmaster or Roulette ..... 27.
Ciasa
Handwriting Analyst ..... 29.
Discovery Software
Arkanoid ..... 27.
Electronic Arts
Chessmaster 2000 *(deluxe chess)* ... 29.
Patton vs. Rommel *(strategy)* ..... 15.
Scrabble ..... 26.
Starfleet I: The War Begins ..... 37.
Chuck Yeager Adv. Flight Trainer .... 32.
Epyx
Sub Battle Simulator ..... 29.
Infocom
Leather Goddess of Phobos ..... 24.
Micro Sports
MSFL Pro League Football ..... 32.
Mindscape
Balance of Power, Deja Vu - ..... ea 30.
Shadowgate, Uninvited - ..... ea 30.
Nemesis
Go Master ..... 49.
Joseki Tutor ..... 30.
PBI
Strategic Conquest Plus ..... 46.
PCAI
MacCourses ..... 32.
MacGolf 2.0, MacRacquetball - ... ea 35.
Road Racer ..... 45.
Primera
Smash Hit Racquetball II ..... 22.

SE Silencer (Mobius)
The Mobius SE Silencer is a "snap-in" replacement for the noisy fan in Mac SEs. Installation takes 15 minutes, and requires no soldering. Mobius found a better design for the fan blades that moves more air, but lets the motor run at a slower speed. It also eliminates the screen flicker caused by the original fans. *(accessories)* **$39.**



Sierra On-Line
Leisure Suit Larry ..... 23.
Silicon Beach
Apache Strike, Dark Castle - ..... ea 27.
Beyond Dark Castle ..... 27.
Simon & Schuster
Star Trek:Kobayashi Alternative ..... 24.
Spectrum HoloByte
Falcon ..... 32.
PT109, Gato ..... ea. 26.
Solitare Royale ..... 20.
Tetris ..... 20.
The Software Toolworks
The Hunt for Red October ..... 29.

DISK DRIVES/ MEMORY UPGRADES

1 MEG SIMMS ..... Call.
AST
Mac286 Co-Processor *(Mac II)* .... 1079.
CMS
CMS TapeStack 60 Meg ..... Call.
MacStack 20 Meg ..... 569.
MacStack 40 Meg ..... 789.
MacStack 60 Meg ..... 849.

Cutting Edge
800K Disk Drive "NEW" ..... 175.
Wedge XL 30 Plus ..... 629.
Wedge XL 45 Plus ..... 829.
XL 30 Internal or 45 Internal ..... Call.
Dayna Communications
DaynaFile single 360K *(5 1/4")* ..... 529.
Dove
MacSnap 2S ..... 750.
MacSnap 2SE ..... 439.
MacSnap 4S ..... 1488.
MacSnap 8S ..... 2975.
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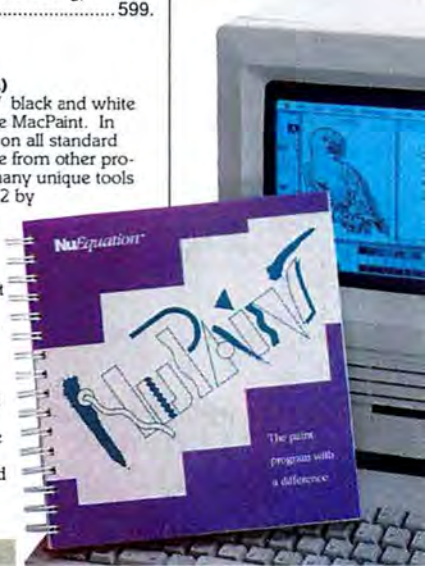
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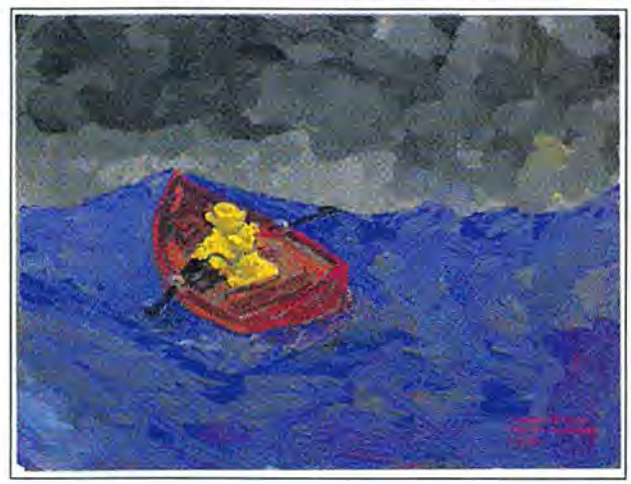
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GRAPHICS

Modern Artist 2.0



One of Modern Artist's strong points is its ability to form smooth color transitions (limited, however, to four per document). The tool palette shows each tool in the color that was last applied with that tool. The space-grabbing tool and color windows can be closed, and the image window can be zoomed to full-screen size.



Is it van Gogh, or is it Modern Artist? The well-implemented Wet Canvas mode was used to render this very paintlike image. It still isn't quite dry.

Mac II users live in the land of the $500 paint application. Is there room in the market for a color paint program at half the price of its competition? You bet there is. The original Modern Artist, priced at $199, had a shot at being that alternative. Any well-constructed product in that half-price range might grab some significant market share. Will it be Modern Artist? Not any more. Version 2.0 is priced at $495. Do its new features and improvements justify the price hike, and can Modern Artist 2.0 hold its own against its similarly priced competition? It would seem that the answer is no.

First, let's take a look at Modern Artist 1.0. In addition to the familiar painting implements, Modern Artist has four special tools: Shading (produces gradational shades), Sunglasses (act like colored filters), Stain (tints a selected color with another), and 3D (enables you to create three-dimensionally shaded objects in one operation). The 3D tool is the most interesting. It simulates spheres and three-dimensional boxes by varying the shading and adding a light source. The shaded spheres look great, especially in Expert mode. Gradational fills don't keep you waiting long, and 3D boxes pop up almost instantaneously, although they lack vanishing-point perspective.

Version 2.0 is a marked improvement in stability over its predecessor, and the program is now comfortable in MultiFinder. A Revert command (restores the original picture), autoscrolling, and rulers are among the added features. Also, three levels of zoom (version 1.0 offered only normal and fat bits) are now possible, and more functions are accessible from the keyboard. And ColorSep, a color-separation utility, has been bundled with the program. Still, Modern Artist 2.0 is not that different from version 1.0. The core of the program and its rather modal and "bulky" interface remain essentially unchanged.

The palette in Modern Artist 2.0 is something of an enigma — it holds only 92 colors. In Expert mode, this is partially explained by the four Color Bands controlling gradations. These bands are defined by clicking on light and dark colors (in conjunction with the 3D or Shading tool), from which the program calculates 32 intermediate shades. To produce them, Modern Artist 2.0 reserves 128 palette choices. Still, even when you add these, you come up short of 256.

Modern Artist 2.0 claims exceptional dithering capabilities and indeed does deliver them. The bottom line is that, in either mode, you have only 92 colors to choose from at any time.

Although Modern Artist 2.0 includes some advanced features, sometimes their utility is curtailed by less-developed functions. For example, the lasso can be configured to precisely select complex shapes or to lift separate areas of the same colors, but there's little you can do with the selection. Such functions as rotation, flip, distortion, and swapping-in complementary colors work only with a marquee selection.

Files produced in standard mode are saved as PICT documents. In Expert mode, files are best saved in *rPIC*. A variation of the PICT format, rPIC was developed along with Modern Artist 2.0 at Reed Institute and preserves gradients and the subtle hues possible with custom palettes. Although this combination would seem to have covered all bases, it does have its limits. Expert mode rPIC files can be transferred only to programs that support this format. When saved as PICT files, Expert mode paintings are automatically transformed into standard-mode documents. Interestingly, PICT files of Expert mode documents appear to possess all the requisite information to be properly reconstituted — if the target applica-

tion is intelligent enough to read them. Studio/8 (from Electronic Arts) recognizes the custom palettes and opens these documents with gradations restored. Reopened in Modern Artist 2.0, such documents can exhibit color shifts and color banding. It's unfortunate that the program can't convert a former Expert mode PICT back into a true Expert mode document.

File importation falters on the same point. Modern Artist 2.0 opens all PICT documents as standard-mode files, losing whatever gradient information they possess. Modern Artist 2.0 has the ability to read but not write EPSF files. But this only partially mitigates the problem of getting out high-quality documents — a serious weakness, especially for professional users. The greatest single improvement to Modern Artist 2.0 would be full import and output support of the PICT2 format.

Modern Artist 2.0 works well enough and is suitable for most painting projects. On the other hand, professional artists may find some of its limitations troublesome. Not as full-featured as Studio/8 or PixelPaint, the original Modern Artist 1.0 was, at least, a decent value at its old price. Now, even with ColorSep thrown in, Modern Artist 2.0 compares unfavorably with its competition.

— *Carlos Martinez*

Modern Artist 2.0
★★½



List Price: $495
Published by: Computer Friends, 14250 N.W. Science Park Drive, Portland, OR 97229; (503) 626-2291.
Version: 2.0
Requires: Mac II with 1 megabyte of RAM (2 megabytes recommended) and color video board.
Compatibility: Mac II and MultiFinder friendly.
Application Size: 249K
Copy Protection: None



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ORGANIZATIONAL TOOLS

ArchiText

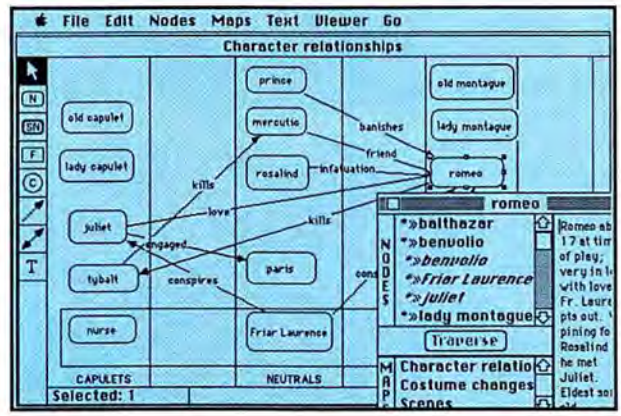
ArchiText is a text processor — a software genre that goes a step beyond mere word processing. Text processing is computer-assisted reading in the way that word processing is computer-assisted writing or databasing is computer-assisted filing. Closely related conceptually to hypertext, text processing lets users search, comprehend, share, and communicate text with unprecedented effectiveness.

Long documents or large sets of documents can be searched with great efficiency, and the search process itself generates a context and structure for the information when it is found.

Further, text processing gives the reader command of the structure of the document, allowing different users to share the same textual information while maintaining their own respective views of it. They can readily import, export, and copy each other's view of the subject. In this way, text processing becomes a powerful communication tool, making it possible to send, receive, and access information in the form as well as the content of the document, so that people can share and exchange structures along with data.

Until now, true text processing has been available only in the PC environment. BrainPower's ArchiText makes text processing available on the Mac, but it accomplishes more than that. ArchiText's graphical expression of text-processing concepts mates text processing and hypertextual communication better than any single product to date. And unlike any other text processor I've seen, ArchiText can handle graphics through the same procedures as text.

ArchiText documents can be entered directly or created from imported text. The user — either manually or by automatic procedures based on text strings, Boolean operations, or paragraph breaks — divides the text into *nodes.* Nodes are units of text consisting of a word, list, graphic, entire journal article, or almost any length or kind of text.



ArchiText's maps allow a high-level view of connections between nodes (inset window at lower right). Connections can be explicit (arrows in maps or implicit (enclosing boxes in maps, Roman type in node window). Benvolio appears twice in the node window — in italics because he's Romeo's friend, in roman type because he's a Montague.

The user then connects the nodes into *maps* that represent the relations between the pieces of text. Any number of users may create any number of maps for the same set of nodes. A crude example: A chemist's map would put apples, onions, and watermelon into a close relationship based on water and sugar content, while a chef's map would differ considerably. Map connections can be specified automatically by keywords or Boolean operations on keywords, or the user can impose them with a set of simple drawing tools through the graphic interface.

The reader selects one map as the *driver map,* which specifies paths through the text, determining which nodes can be selected from which other nodes. The reader can switch maps as well, and can look at a map in graphical representation to get an overview of the information.

Experienced users of text processors will be delighted. The ArchiText commands naturally and intuitively express the common text-processing functions in graphical form. On the other hand, if you're not so experienced, ArchiText's problems in documentation and Mac implementation will make things difficult.

As is the case with so many other path-breaking products, version 1.0 is burdened with documentation that explains how to do everything without really telling you why you would want to do it. Further, the tutorial's trite sample data make it easy to miss important features and capabilities. And the node/map terminology is defined only by a clumsy, self-referential glossary. I often resorted to penciling in conventional terms next to the ArchiText ones in my manual.

Weak documentation can be overcome at the cost of user frustration. But there is a bigger frustration for experienced Mac users: the occasional use of not-quite-orthodox commands. For example, sometimes double-clicking an item means the same thing as clicking the Open button; sometimes it doesn't. Similarly, clicking the close box means *close the current window,* but Close in the File menu means *close the document.*

ArchiText is the most advanced text processor on the market and could well make the Mac the platform of choice for text processing. It is highly recommended for people with extensive experience in text processing and for those willing to endure considerable frustration to learn.

— John Barnes

ArchiText



List Price: $349.95
Published by: BrainPower, 24009 Ventura Blvd., Suite 250, Calabasas, CA 91302; (800) 345-0519, in California (818) 884-6911.
Version: 1.0
Requires: 1 megabyte
Compatibility: Mac II and MultiFinder friendly.
Application Size: 196K
Copy Protection: None

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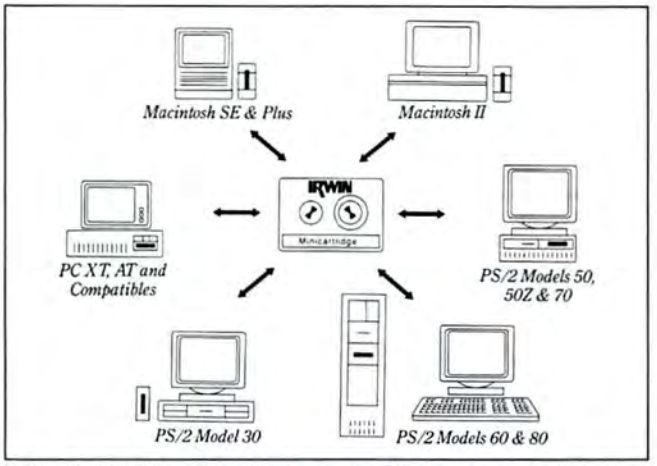
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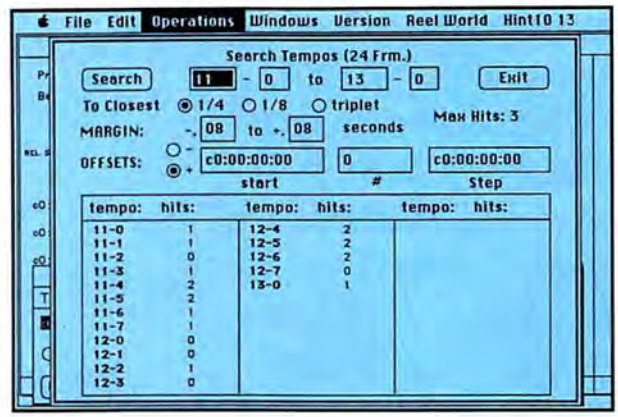
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M U S I C

Cue: The Film Music System



Timing your "hits" to each zap, crash, or emotional high point is easier when you use Cue's Search function. Cue gives you a list of tempos and the number of hits for each, and even indicates which hits a given tempo will catch.

Grizzled Mac veterans may occasionally curl a lip at the blithe praises computers get for making complex tasks simple. (Remember your first experiences with telecommunications?) But Opcode Systems has a package that can really do the trick for those who compose music for film or video. Sure, playing and composing music can be creative and intuitive fun stuff (no letters, please). But determining the length and tempo of the music you're paid to put behind a four-and-a-half-minute battle with the hideous alien forces from Galaxy K-30, complete with a musical "hit" timed exactly to every laser shot, tentacle slash, and spaceship crash takes time.

Multiply that by every scene in the film — from touching romance to gripping tension — and you've got a job that needs one old-fashioned no-kidding attention span, brother.

Written and documented with intelligence and a real knowledge of the industry, Cue takes much of the drudgery and guesswork out of the tedious task of synchronizing *cues* — short bits of music — to a film's various parts. Cue automates two of the toughest chores in film scoring. The first is *spotting* and logging not only each point in a film where you want a cue to start and stop but also scene cuts and other noncued reference points as well. The Input window provides a stopwatch that times events in the film and displays them (in any of the American or European SMPTE, 35- or 16-millimeter formats you might need) next to a 24-line field where you de-

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scribe the action. The software automatically assembles each set of times and comments in a nice, readable list on the *cue sheet,* which you can print out in a number of different formats, depending on what you want to see. If you don't like what you've got in the cue sheet, there are a number of simple ways to change or delete any one or a range of your entries.

The second big job the software accomplishes is to search for a tempo. Once you know all the points you want your cue to accent, the trick is finding a tempo that will put musical beats on the hit points.

Cue presents you with a list of tempos and the number of hits each one catches. It then lets you zoom in to see just which hits a tempo catches and which it misses.

To better its score, it calculates accelerandos and ritardandos — minuscule or large — that catch more hits.

In addition to its two main functions, Cue has many more features than can be mentioned here. It creates *streamers* and *punches* that help the orchestra conductor follow the score; lets the user tap in a tempo on the Mac keyboard; generates music-notation scratch paper with cue-sheet information already written on it; and sends out MIDI clock data for synchronizing to a sequencer.

And in order to assist you at the business end, Cue generates a Performing Rights Cue Sheet listing the title of the production and its cue and reel number and name; the percentage and affiliation (BMI, ASCAP) of the composer and publisher; and the way the music will be used in the production (background, on camera etc.).

With Cue taking care of the details — synchronizing hits, taking care of the business end of things — you'll be able to concentrate on the more important things (like creating music or schmoozing with producers).

As they say in Hollywood: Cue baby, you're beautiful.

— *Tim Tully*

Cue: The Film Music System

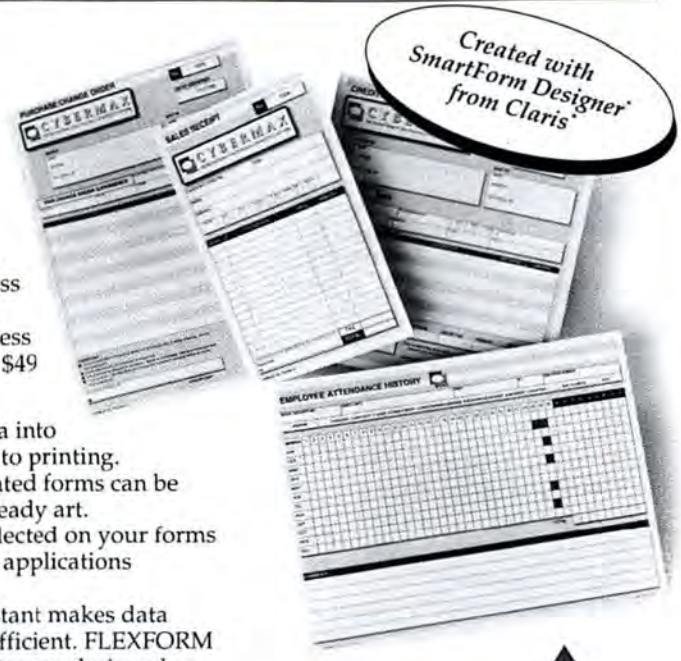
★★★★½



List Price: $595
Published by: Opcode Systems, 1024 Hamilton Court, Menlo Park, CA 94025; (415) 321-8977.
Version: 2.0
Requires: 512KE
Application Size: 227K
Compatibility: Mac II and MultiFinder friendly.
Copy Protection: Key disk protected and two hard-disk installations allowed.

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Quick Clicks

ORGANIZATIONAL TOOLS

For the Record



This is For the Record's main screen. Choosing a category on the left brings up the appropriate list of subcategories. Double-click on a subcategory to go to its screen.

There are times when we all wish we had our lives better organized. This is as true of the compulsively organized as it is of the haphazard, file-it-in-piles people. Our lives are intimately tied to the papers and forms that document our possessions, plans, wishes — our very existence.

Since organization is what computers are all about, you could create a database outlining what things are and where they lie in the general scheme of things. Creating such a database is a fairly straightforward but extremely time-consuming project. Not only will you need to be well-organized (so that you cover everything) but also you'll need plenty of time — both to design and fill in the database.

Fortunately for us, For the Record exists. For the Record is a database specifically designed to keep track of your legal, financial, and personal records. It's by Nolo Press, the publisher of many excellent books and programs on legal advice that are useful to both lay people and lawyers.

For the Record consists of a program disk and a book that is both manual and text on personal-record keeping. It's obvious that a tremendous amount of effort went into the design of the program and the writing of the manual.

This program is not very advanced as Mac databases go, but it's superb for the job it was designed to do. And it follows the Mac interface well; operation is intuitive. There's also a Help menu that lives up to its name.

Start by selecting an entry screen from a master screen that lists 27 major record categories. These range from Emergency Information to What's Owed You, Burglar Alarms, and Estate Matters/Will. Filling out the screens and moving between them is simplicity itself. Each screen can have a pop-up notecard attached. That's useful if you run out of room in any of the fixed-size fields.

Much of the data you'd enter in For the Record is sensitive and should not be stored openly. To ensure confidentiality, the program allows simple password-locking of all screens. The manual warns you that a determined hacker could break the passwords, but casual (or nonhacker) browsers will be kept out. The passwords seem reasonably secure to me; it took more time than it would normally be worth to get into a locked screen.

One of the strengths of the program is its printing abilities. You have no choice of report style, font, or formatting; you just specify what to print, and For the Record prints it rapidly and nicely. Since these reports are for you or people who are handling your affairs, that's just what you need.

The program is weak when it comes to linking your records. Each screen has a cross-reference button, but clicking that merely brings up a dialog box suggesting other categories to check. You'll find yourself entering the same information in several screens, having to retype it all in each time. There's no way to import or export data. There's also no Save command. The program saves automatically every time you leave a screen, which seems safe enough, but I'd like a manual Save option.

The manual, which is divided into four sections, is as much a reference book on record keeping as a manual. The very large first section not only covers record keeping in depth but also frequently gives legal advice. One of the authors of For the Record is a practicing attorney, and the legal advice is of the same high quality found in all Nolo books. An attorney friend of mine took a long look at For the Record. She said that while she didn't always agree with the advice given, it was never wrong. Being a lawyer herself, she would approach some things slightly differently.

The manual focuses mainly on explaining to you what records should be stored where, and why. The next section of the manual is on estate planning, a Nolo specialty. This is an excellent treatment of a sobering subject. The last two sections of the manual are a well-written but rather ordinary computer-program manual.

Filling out a database in For the Record takes a lot of time and effort. But it's time and effort well spent; your records will be in order and easily accessible. You can rest assured that your affairs can be well handled if something happens to you.

— Ellen Hirame

For the Record

$$$$

List Price: $49.95
Published by: Nolo Press, 950 Parker St., Berkeley, CA 94710; (800) 992-6656; in California (800) 445-6656 or (415) 549-1976.
Version: 1.0
Requires: 512KE
Compatibility: Mac II and MultiFinder friendly.
Application Size: 325K plus data file, which when empty takes up 139K.
Copy Protection: None

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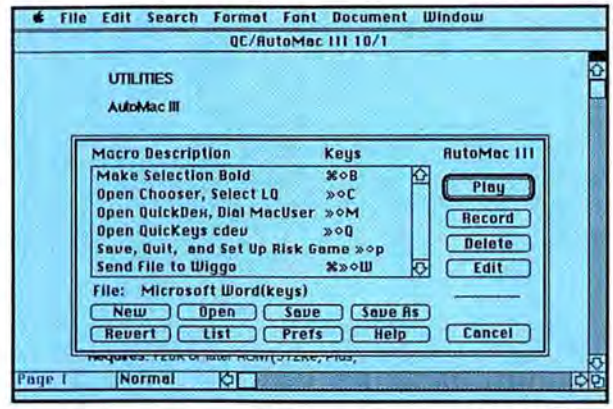
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Quick Clicks

UTILITIES

AutoMac III



This is the basic AutoMac III work area. Create, delete, and run macros from this nonmodal dialog box.

As programs become laden with more features, the ability to easily perform complex action sequences becomes vital. Some programs — such as Excel, WordPerfect, and most major telecommunications packages — offer such abilities. The action sequences are generally, but not always, called *macros.*

AutoMac III lets users create and use macros from within virtually every program. It's a small, well-designed, well-behaved INIT, which means you simply drag it into your System folder and restart your Mac to install it.

In that respect it's similar to Apple's MacroMaker (included with System Software Update 6.0.2) and Affinity Microsystems' Tempo II. Of the three, I found the AutoMac III interface the most intuitive. However, all are easy to use. If a program works with one of these macro applications, it most likely works with all of them.

You normally access AutoMac III's main control panel by clicking on a tiny A that is always in your menu bar to the left of the Apple. Most macros are created using a very simple recording process. You assign a name, add (if you wish) a set of keystrokes that will play the macro, and turn on the macro recorder. Then do exactly what you want the macro to do. Finally, stop the recording. That's it. The excellent manual offers good advice on creating and fixing macros. Read it, especially if your macros don't behave the way you expect.

Unlike its competition, AutoMac III offers a powerful macro-editing feature. It's up to the user to decide whether to make the macro editor available (it consists of two files, and you'll save 35K by not installing it). You can use the macro editor to create a macro from scratch, correct or fine-tune existing macros, combine two or more macros, and design alert boxes without having to record them.

While that's easy enough, your recorded macro might not work for many reasons. The macro may be designed to react to a particular environment, with, say, an icon in a specific place. If the environment is altered (the icon is moved), the macro might fail. Another example of how AutoMac III normally works and how that might not be the way you want it to work is the way it tracks the position of the mouse. The normal (default) method doesn't record the details of the path. Only the mouse's positions when it's clicked and when it's released are recorded. This can speed up playback, as the macro simply moves the cursor from point A to point B via a straight line. And in most cases, the path simply doesn't matter.

However, if you're using a macro to create, say, a graphic signature, the path followed by the mouse is what counts. And a normally recorded macro will just give you a straight line (not too unlike some people's signatures). To get your signature into a macro, turn on AutoMac III's Record Full Drag. AutoMac III isn't without some flaws — none of these macro programs are. It depends a little too much on the exact mouse position when recording a macro. This problem is particularly noticeable when your macro involves selecting items way down long menus or on submenus. There are two things you can do to minimize this problem. First, when recording macros, be as careful as possible to center your clicks on menu items and buttons. The second improvement requires that you get familiar with, and use, the built-in macro editor. It's powerful and not at all hard to use. Simply replace all menu-selections-by-mouse-position with direct menu and item calls.

The program generally works when MultiFinder is running, but there are some problems. Considering that Microsoft is distributing AutoMac III as a bonus to Word 3.0x purchasers and will distribute it with Word 4.0, I was surprised when AutoMac III sometimes caused Word to quit.

I found AutoMac III slightly better than Tempo II and much better than MacroMaker. It's more accessible, has a nicer interface and a great macro editor, and is a bit easier to use. It works (almost always) and does things that no other type of program (including keyboard enhancers like QuicKeys) can do. If you already use Tempo II, there's no overwhelming reason to switch. But if you're in the market for a macro program, AutoMac III deserves a good hard look. — *John Langston*

AutoMac III

★★★½



List Price: $79.95. Also distributed with Microsoft products (Word 3.02 and 4.0, File 2.0).
Published by: Genesis Micro Software, P.O. Box 6236, 17124 N.E. Eighth Place, Bellevue, WA 98008; (206) 747-8512.
Version: 2.0
Requires: 512KE
Compatibility: Mac II friendly; some problems with some programs when MultiFinder is running.
Application Size: 33K; Macro Editor feature and Help add 35K if used.
Copy Protection: None

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UTILITIES

DiskFinder

If you frequently find yourself looking through dozens of disks to locate a particular piece of clip art or a missing spreadsheet template, then DiskFinder can help. But you'll have to be highly motivated — it's a lot of work.

DiskFinder does its job and does it well. It helps you catalog all your files spread across many disks. With a little bit of effort, you'll be able to access any file on any disk in your collection in a few seconds.

Install DiskFinder in your system as you would any DA. If you have a hard-disk drive, DiskFinder keeps a catalog of all your floppies in a Library Folder. If you're running a floppy-disk system, the manual suggests you designate a separate floppy the Library Disk.

Cataloging your disks is easy but not very intuitive; for some reason, you must unclick the Use Library check box to enable the Catalog This Disk button. However, once you've figured this out, DiskFinder will catalog your disks very quickly. On my hard-disk drive with about 45 megabytes worth of data in over 1,000 files, DiskFinder created a catalog in 22 seconds. Floppy disks take only a few seconds to catalog. After you've cataloged a disk, the program prompts you to label the disk with a number.

Once you've cataloged all your disks, finding a file is easy and quick. Simply call up DiskFinder and fill in the Search dialog box (an Options window allows you to set search criteria, including file type or creator, creation or modification date, and size of file). Because the program needs to search its library only and not entire disks, results are almost immediate.

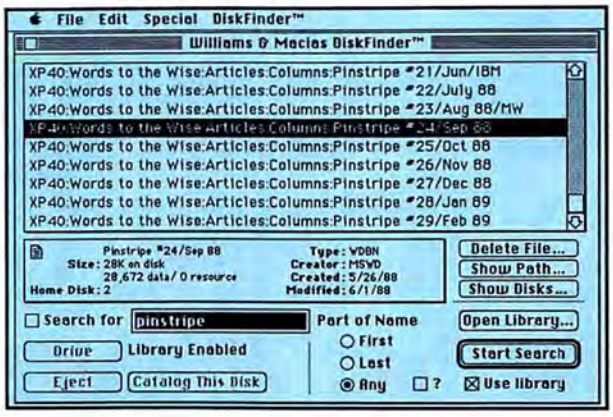
DiskFinder, however, is not always the most convenient program to use. To keep the library current, you must manually update it every time you finish a session in which you've added, deleted, copied, or renamed files. Users with hard-disk drives who mainly use floppies to archive files may find this acceptable. Users without hard-disk drives, however, are likely to do an awful lot of disk swapping, due to the necessity of cataloging all the changes on the library disk. Whether it's worth it or not depends on the size of your file-management problems and how much effort you want to expend to solve those problems.

The program lacks some of the niceties we've all come to expect from well-behaved Mac programs. Check boxes and other accoutrements of the Macintosh interface are used in a nonstandard, nonintuitive manner. On every disk it catalogs, DiskFinder creates a data file on the root level of the disk. Such files should either be made invisible or placed in the System folder, if there is one. On the other hand, DiskFinder's on-line help is excellent. This, combined with the HyperCard Help stack, means that you will not need to open the manual, which, though complete, is poorly organized.

Although DiskFinder performs as promised, the program lacks that extra dimension that would make it a must for the serious user. Any utility program requiring constant user vigilance to retain its usefulness has limited appeal. For hard-disk users, at least, this need not be the case.

One can easily imagine an INIT that would automatically catalog all file changes. DiskFinder may find its niche with some users, but it still needs refinement before it appeals to the masses.

— *Larry Husten*



DiskFinder will search on-line disk volumes for files, or it will search through a previously created catalog so you can search off-line disks, too.



DiskFinder offers many options to narrow the search, or you can just search by name.

DiskFinder
★★½

List Price: $49.95
Published by: Williams & Macias, S. 3707 Godfrey Blvd., Spokane, WA 99204; (800) 752-4400, (509) 458-6312.
Version: 1.07
Requires: 512KE
Compatibility: Mac II and MultiFinder friendly.
Application Size: 51K
Copy Protection: None

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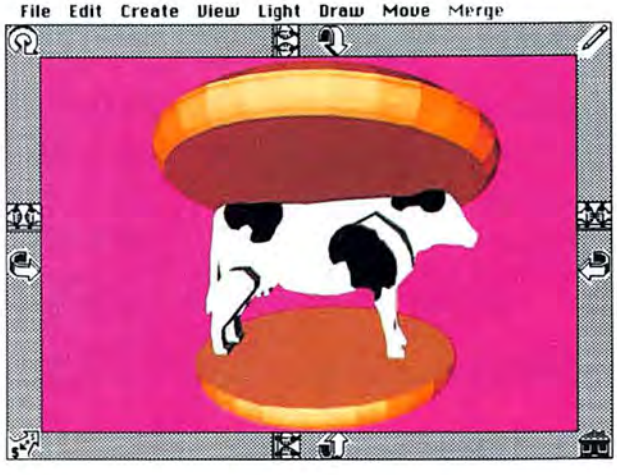
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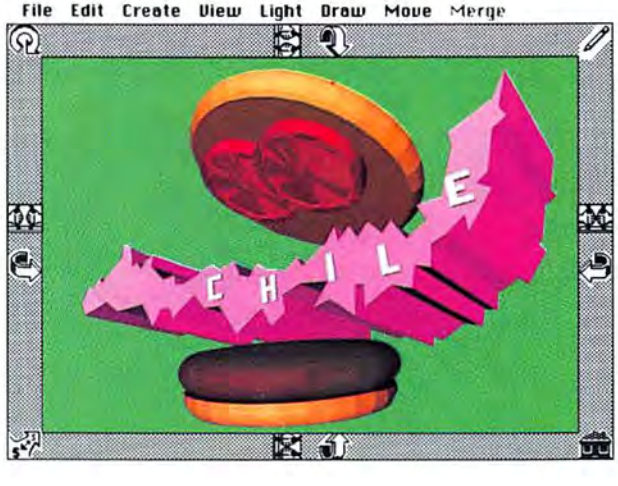
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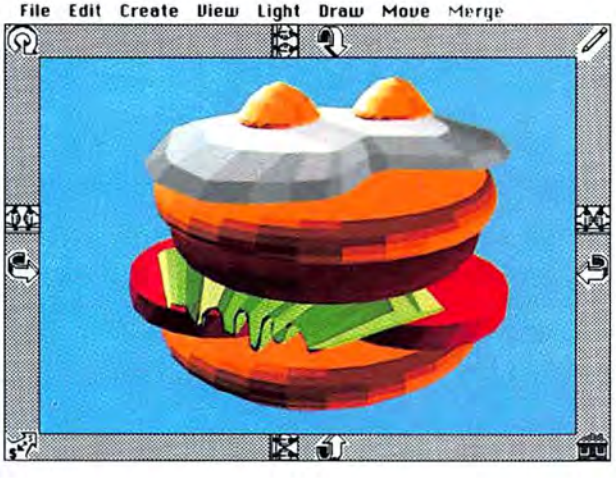
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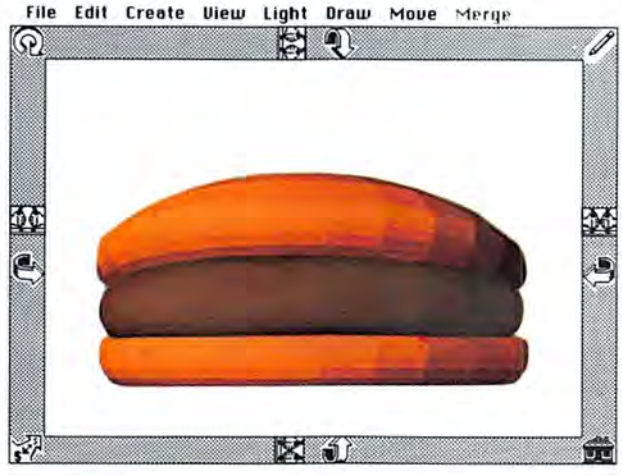


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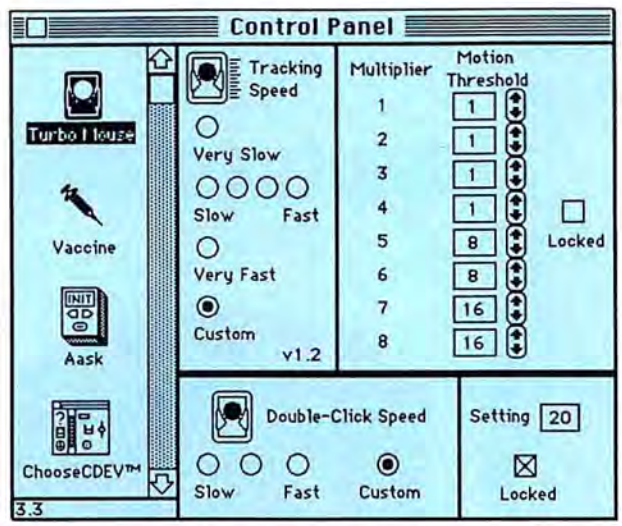


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HARDWARE

Turbo Mouse ADB



A trackball cdev available from Kensington lets you change the setting on your Turbo Mouse ADB.

Mice are fine pointing tools. However, I've never been convinced that they are the ultimate cursor-control device. And so I've tried every alternative tool that I've seen. I've gone through regular mice, optically tracking mice, touch screens (not on a Mac), trackballs of all shapes and colors, the Felix, graphic-input pads (both with hard-wire connections and wireless), and more. Only the original Assimilation trackball (later marketed by Kensington) and the Felix proved superior to the standard Apple-supplied mouse.

Kensington has totally redesigned its trackball, the Turbo Mouse ADB, to make it compatible with the Apple Desktop Bus, the input standard for SEs and Mac IIs. This new entry, which can do far more than simply position the cursor, is the finest Macintosh pointing device available.

No matter how many extra features a pointing device offers, the most important criteria are pointing speed and accuracy. Does it let you put the cursor where you want it quickly and without overshooting? In simple terms, is its pointing ability equal to that of the Apple mouse? The answer, for the Turbo Mouse ADB, is a resounding yes. At 200 dots per inch (dpi), it positions the cursor with more accuracy than the original mouse, which delivered at 80 to 90 dpi.

Trackball feel is as much a matter of practice and device cleanliness as anything else. Once you get used to the Turbo Mouse (and that took me a surprisingly short time), it has excellent feel. One feature that takes some time to get used to is its automatic acceleration. The cursor moves at the speed you are moving the ball. As you move the ball faster, the cursor moves even faster, moving several pixels for every one it would move at lower ball speed. Normally, you control the Turbo Mouse's response by setting the Mouse section of the Control Panel DA. That's enough for most users.

However, if you want more control or wish to totally customize the response, you can get (from Kensington, by direct mail only, for $15) a control panel device (cdev) that lets you use your Control Panel DA to set and customize your Turbo Mouse ADB's settings. The cdev is nicely done. It changes the actual settings as you change them, so you can experiment without quitting the Control Panel DA or rebooting. I've used this to change my Turbo Mouse's response to something very like the original mouse with the mouse scaling feature turned on.

The Turbo Mouse ADB has a 4.5-x-5.75-inch footprint. The curve of its top surface matches the curve of both regular and extended keyboards, so you can butt the device right up against your keyboard. It also matches Apple's platinum color exactly. Trackballs that have a loose ball, like this one and the Abaton ProPoint, are much easier to keep clean. Just remove the ball and wipe out the cavity.

The Turbo Mouse ADB has two buttons. One transmits a normal mouse-down event (Click) while the other locks the button in the down position (Click Lock), which is very useful when making extended selections and in creating graphics. Pressing both buttons simultaneously (the manufacturer calls it *chording*) transmits a Command-key equivalent you've preselected. You can pick from Command-N, -O, -W, -S, -P, -Q, or -Z. In many programs, these commands are equivalent to New, Open, Close, Save, Print, Quit, and Undo. Just be aware that the Turbo Mouse sends a Command-key combination, not a real menu choice. Options are selected when you set a series of DIP switches on the back. While setting the switches isn't hard, these options should have been software settable. There also should be a setting that disables Click Lock, making both buttons function identically.

Kensington also provides a stick-on mouse pocket, so you can retire your mouse in style. And you will, once you try the Turbo Mouse ADB.

— Ellen Hirame

Turbo Mouse ADB



List Price: $169.95; cdev $15, direct order only.
Manufactured by: Kensington Microware Ltd., 251 Park Ave. S., New York, NY 10010; (800) 535-4242; in New York (212) 475-5200.
Version: 3.0, Model 62360
Requires: SE or Mac II
Compatibility: Mac II and MultiFinder friendly.
Application Size: 12K (optional)
Copy Protection: None



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Quick Clicks

HARDWARE

Mac-105 Keyboard

Cutting Edge's Mac-105 Keyboard is a good alternative to Apple's standard Apple Desktop Bus (ADB) keyboards. Its size and configuration are the same as those of the Apple Extended Keyboard, and it has the same basic key layout. It has (surprise!) the same 105 keys that are found on the Apple Extended Keyboard, including the 15 function keys.



The Mac-105 Keyboard is a low-cost alternative to the Apple Extended Keyboard.

The differences in key layout involve the Return, Delete, and Backslash keys. On the Mac-105 Keyboard, the Return key is enlarged to occupy the space where the Backslash key is on the Apple unit as well as its own space. This large, L-shaped Return key is popular on many office machines and other keyboards. It's a nice change to have such a large key on the Mac, since Return is used so often as a default in dialog boxes. The Backslash key has been moved up inside the Delete key, leaving a very small Delete key. Some typists don't mind that, but I certainly miss it far too often.

The actual keys of the Mac-105 are a bit higher than those on the Apple keyboards, slightly more sculpted, and slightly smaller on their tops. I found all this advantageous, because I have fairly large fingers and it is easier for me to avoid double-striking keys, something I occasionally do on the Apple keyboard.

The feel of the keys is the Mac-105's weakest point. There's none of the firmness that the Apple keyboards have. There is tactile and audible feedback, but it isn't very strong. The keys click both on the way down and on the way up, a feature that some users find disconcerting.

The Mac-105 Keyboard weighs considerably less than the Apple keyboard but isn't at all flimsy. It might appear that way, but it held up well to my simple torture tests. In fact, it easily survived one test that destroyed an Apple Extended Keyboard.

As you would expect, there are two ADB ports, so you can chain devices. There are also stickers under the F1 to F4 keys. These look cheap and are already starting to peel off after 60 days of use.

This keyboard is distributed by both Cutting Edge and Ehman Engineering (they're actually two parts of the same company). The unit distributed by Ehman is bundled with CE Software's QuicKeys, so it is a terrific bargain. The Cutting Edge version is available for substantially less and is an excellent keyboard. If your choice is between the standard Apple keyboard (no function keys) or the Mac-105, go for the Mac-105.

— *John Langston*

Mac-105 Keyboard
4½



List Price: $179; with QuicKeys, $199.
Manufactured by: Cutting Edge, P.O. Box 1259, Evanston, WY 82930; (800) 443-5199, (307) 789-0582.
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Compatibility: Mac II and MultiFinder friendly.



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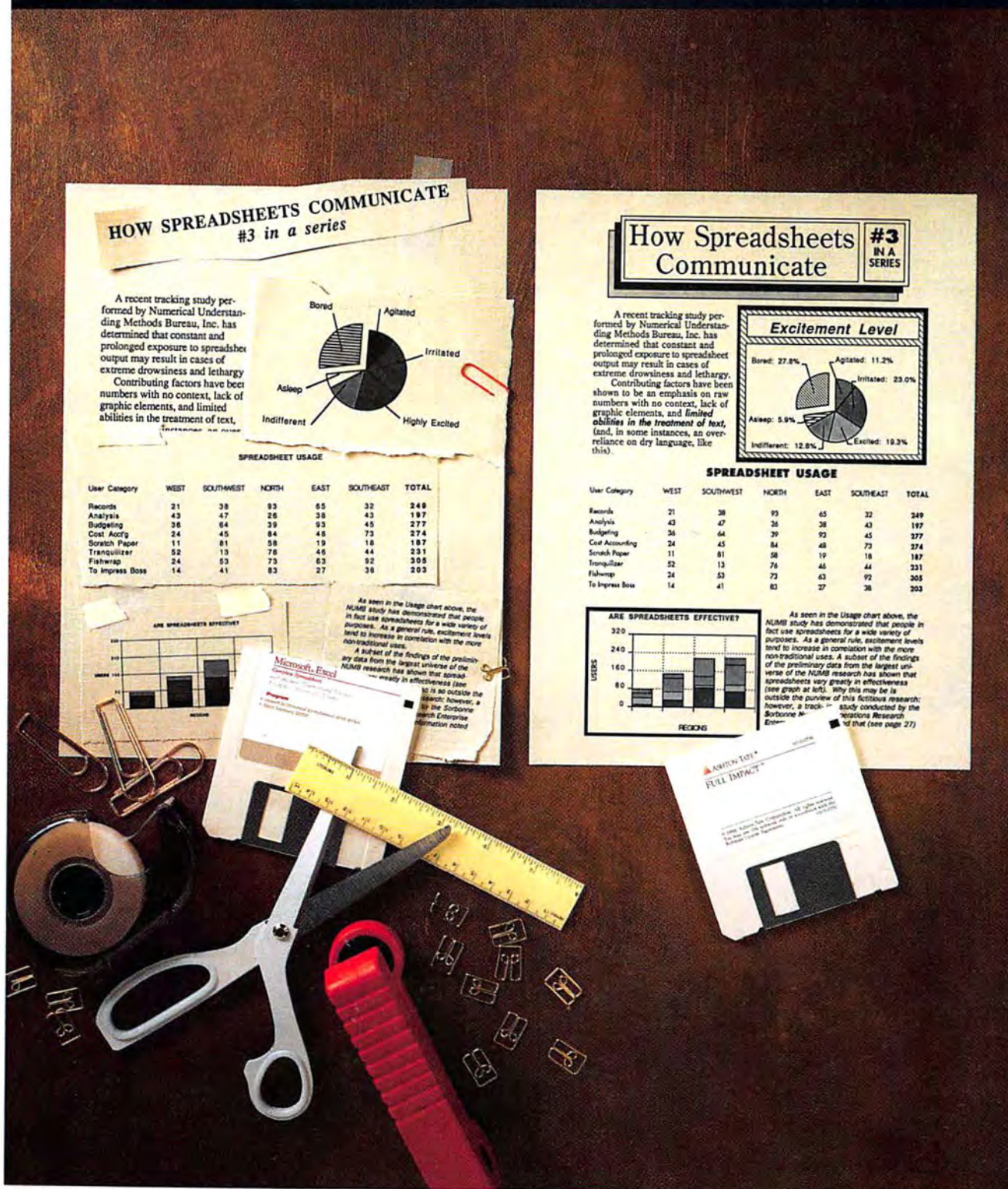
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The Next NeXT Question

Here's an idea: Let's bring out a hot new personal computer. Let's give it a brand-new operating system incompatible with anything that runs on any other computer. Let's make anyone who wants to write software for it write us a nice high school theme–style essay about why they want to and why they think we're so swell ourselves. If they write a winning essay, we'll not only loan 'em one of these computers, we'll let them bring their finished products back to us for possible distribution. They'll have to come back to us because we won't put a floppy-disk drive in the machine. That way there won't be any easy way to distribute software for it!

And let's not set up any commercial distribution for the machine. Who needs it? We'll sell to . . . college students! At, say, $6,500 or so per computer. Plus maybe $2,000 for a printer. *Business Week* and *Newsweek* and *AlmostEveryOtherWeek* will put us on their covers and write glowing stories about our technological wizardry and marketing genius.

I give you the NeXT computer from Steve Jobs.

Listen: I think the NeXT machine is a masterpiece — a masterpiece of design, of packaging, of marketing, of orchestration of the public's expectations, of . . . hype. I even think it's going to be an important machine and will begin to change our minds about tightly controlled standards for computers, operating systems, and software.

But what the NeXT computer definitely is *not* is a technological tour de force. Which is a large part of what has me on my high horse about the machine. Not quite universally, but nearly so, the business press and large chunks of the trade press have treated Stevie's New Wonder as a technological marvel, a big leap forward to the edge of tomorrow.

Look — we have here a high-resolution, black-and-white monitor, the Motorola 68030 chip (which you'll also find in the Mac IIx and soon in many other machines), a keyboard and a mouse, a bunch of RAM, and some very nice cabinetwork.

I'm not about to knock that nice cabinetwork: I've been screaming for better design in computers for a long time, and the NeXT stuff is the best I've ever seen. The frogdesign people (ex-Apple IIc, Logitech mouse, and so on) did a great job.

But that sexy little black cube and the nice big monitor and, oh yes, a $2,000 400-x-400 dot-per-inch (dpi) printer — a predictable advance in printer resolution at a price that simply means Jobs expects to make his money on the computer — house little new technology. This is a bolt-it-together box of nice components with hardly anything fundamentally new in the way those off-the-shelf components are put together.

Mach, the NeXT operating system, is yet another UNIX variant. It has a nice graphic shell. Period. Unfortunately for NeXT's customers and the UNIX development community, Mach is sufficiently different from standard UNIX — whatever that is — that moving an application to it isn't just a matter of a recompiling, nor even of a few days' work fixing errant code by hand.

That may be just as well from Jobs' and NeXT's viewpoint — it increases their control over the software market for the machine and lends an air of exclusivity to the product by excluding so many programs and developers.

But in the end every great computer succeeds because of great software. I'm perfectly ready to say Stephen Wolfram's Mathematica, bundled with the NeXT computer, is great software. And T/Maker's WriteNow, playing soon on a NeXT PC near you, is mighty nice too. But what about other programs?

While Jobs & Co. say they'll deliver a nifty reference library on those magneto-optical disk drives in NeXT machines, the intriguing question is just how other software will be distributed for the machine. Without a built-in floppy-disk drive, it's going to be tough to write new programs into the machine's mass storage

The business press has treated Stevie's New Wonder as a big leap toward the edge of tomorrow.



BY JIM SEYMOUR

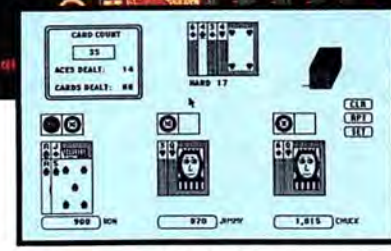


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— except, of course, those programs that users write themselves.

One option is to hang a very expensive standard hard disk on the machine. But that's a realistic option for only a tiny fraction of the computer's potential buyers: America's college students.

If the universities cooperating with NeXT in this adventure are to succeed in persuading students to buy their own NeXT machines, someone will have to look hard at that $6,500 price tag. Even at that level,

Will the little insanities in the machine and its marketing keep it from creating the independent standard Jobs is seeking?

say several computer-manufacturing people I've talked with, Jobs can't make any money: It's too near his cost of goods. Yet there's a pretty well established threshold of pain for college students interested in buying computers — and that threshold is around $3,000, or less than half the price of the NeXT box.

What Jobs has done is undeniably important: He's brought a fascinating new computer to market. (Or will soon — at least soon after he's saturated the college market, which won't actually be getting the machine till well into 1989.)

The machine sets new standards for looks, for the management of the expectations of the press, for the general public, and for the likely buyers of the machine. The question is whether the little insanities in the machine and its marketing will keep the NeXT computer from establishing that independent standard Jobs is seeking.

The jury's still out on that one. But the betting action's mighty hot. Do I hear three to one . . . ?



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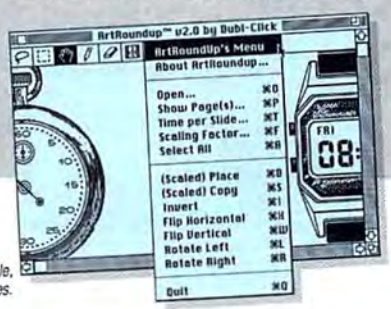
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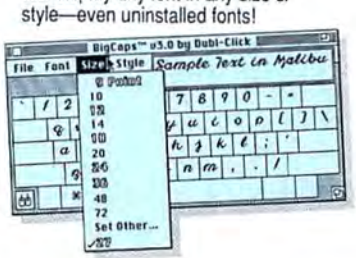
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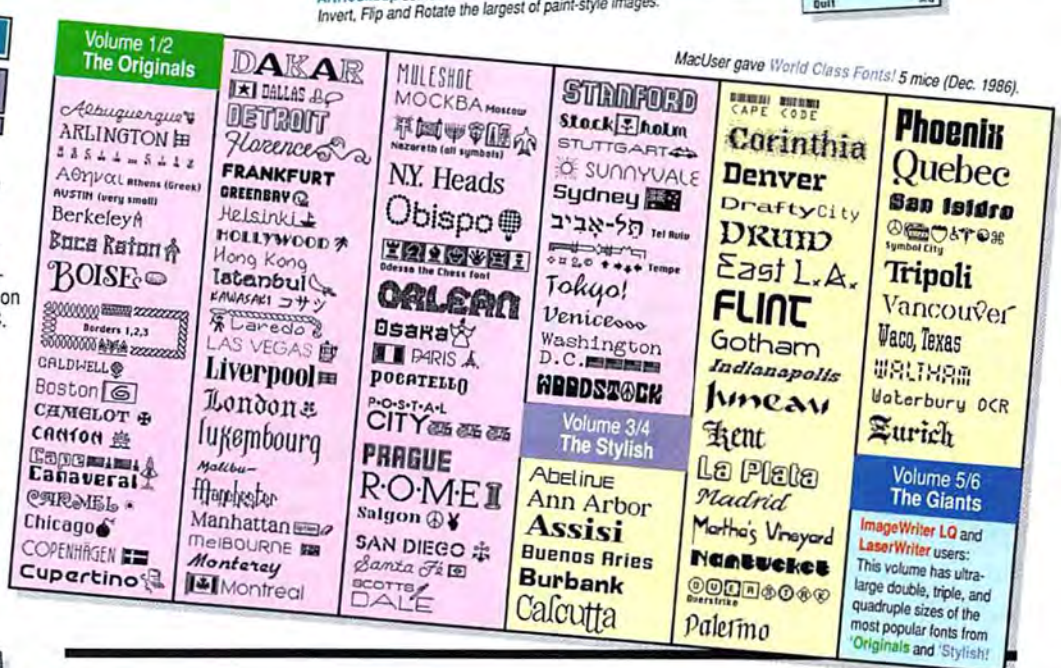
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The Second Coming?



Unless you've been shipwrecked on a desert island or in a coma for the past several months, you have been deluged with information about the long-awaited NeXT machine. From the coverage this company and product have gotten in the press, you'd think that it was the Second Coming. Well, it is a second coming of sorts — only it's the second coming of Steve Jobs and not of a savior (although there are those who confuse the two).

Admittedly, the saga of NeXT and its founder is a fascinating tale. Steve Jobs, wunderkind of the computer industry, changed the face of computing forever with the Apple II and repeated his triumph with the Macintosh. He started in a garage and ended up with a Fortune 500 company, only to lose control of his creation in a power struggle with the man he had brought in to take the company into the 1990s. Not content to sit on his laurels, lick his wounds, and count his money, Jobs then started another company with the intention of changing the world yet a third time.

Even though the company started with nothing more than money and Jobs' vision, NeXT, Inc. was news for a long time. People just loved to speculate about what Steve was up to, and what little information did make it out of the company kept the interest of the computer press. When Ross Perot, founder of EDS (famous for rescuing its employees from Iran) and recent thorn in the side of General Motors, threw some of his money into the venture, interest in the company became widespread among the press at large and on Wall Street. And since NeXT was working on a machine for the educational market, the company was on the minds of many in the academic community as well.

Finally, in October 1988, the curtain of secrecy was raised, and the media circus began. At the announcement press conference, savvy veterans oohed and aahed like schoolchildren at a magic show. And not without reason. The NeXT machine is indeed an impressive blend of the latest technology, a showpiece for Silicon Valley's finest work. From its high-speed processor to its custom chips to its multimegabyte erasable optical disk, the NeXT machine takes the state of the art another step forward.

But what does this machine mean to the business market? Nothing; not directly, anyway. To begin with, volume shipments won't begin until well into 1989. Even when the machine does ship in volume, it won't be heading for corporate desktops; this machine is intended only for the educational market, at least for some time to come. Originally the restriction to the education market was part of Jobs' severance agreement with Apple, but that agreement has expired. It turns out that Jobs was serious about his intention to make a workstation for education. NeXT is committed to education, so it may be a while before the company even begins to consider attacking the business market.

The impact of the NeXT machine will be felt in the commercial marketplace, however. Once someone blazes a technological trail, many companies will follow. IBM has already licensed some of the software NeXT developed. Companies such as Apple that enjoy technological leadership will be striving just a little harder in the technology race now that there's a new entrant in the field.

So while you may not end up with a NeXT machine on your desk, your next Macintosh may well be the better for the added impetus that Apple (and the rest of the industry) has gotten from Steve Jobs and NeXT. The competition will, as always, be good for everybody, especially the users.

Steve Jobs has already hit two out of the park in an industry where striking out is commonplace. Even Steve has struck out (anyone remember the Apple III?). If the NeXT machine turns out to be only a single or a double — or even another strikeout —he still has plenty to be proud of. And he's not done yet. Steve Jobs has demonstrated that he came to play, and he won't be retiring anytime soon. So keep your eye on the ball.

Even though the company started with nothing more than money and Jobs' vision, NeXT, Inc. was news for a long time.



By Robert R. Wiggins

Pinstripe Picks

Here are some products worth a look if you use your Macintosh for business. If a product picked here interests you, check the

Programs & Peripherals

Networking Software & Hardware

CE Software Quick Mail	165.	**Shiva** NetModem V1200	359.
Farrallon PhoneNET AppleTalk	9.	NetModem V2400	479.
PhoneNET Din 8 or DB9	35.	**SuperMac Software** Acknowledge	349.
Timbuktu	69.	Multi-User SuperLaserSpool	199.
TrafficWatch	149.	**Symantec** InBox-MacConnection	75.
Infosphere		InBox-Starter Kit V2.0	
MacServe *(Network Software)*	155.	*(3 Personal Connections)*	199.
LaCie Silverserver	93.	**TOPS** Tops 2.0, Tops Dos or Net Print	119.
Microsoft Microsoft Mail 1-4 users	195.	Tops Repeater or Flashbox	129.
Olduvai Software Clip Share	109.	Tops FlashCard	169.
Font Sharer	149.	Tops Teleconnector Din8 or DB9	39.

Desk Accessory Programs

Affinity Microsystems Tempo II	89.	**Imagine Software**	
AffiniFile	46.	Smart Alarms & Appointment Diary	35.
Beyond Inc. Menu Fonts 2	30.	**Mainstay**	
Borland SideKick V2.0	65.	Think'n Time	61.
Cassady & Greene, Inc.		**Olduvai Software**	
HyperDialer	26.	DA Switcher	25.
QuickDex 1.4A	32.	**Solutions, International**	
CE Software DiskTop 3.0	27.	Super Glue	52.
Deneba Software		SmartScrap & The Clipper	35.
Comment 2.0	54.	**Symmetry**	
Electronic Arts Disk Tools Plus	31.	HyperDA *(Req. 512K)*	38.
Exodus Software Retriever	59.	**TENpointO** OpenIt!	59.

Managing Your Money by Meca



Managing Your Money lets you take control of your personal finances! *Managing Your Money* is an integrated financial management program that eases routine record-keeping and helps you make complex financial decisions. Its money chapter easily records income and expenses while automatically updating the tax, planning, and investment chapter. The tax chapter helps you pay the right amount of taxes (as little as possible) and conforms to the new tax laws. The loan and insurance planning chapter lets you plan for college retirement, and insurance needs. The investment chapter lets you make the most of the investments in your portfolio. Best of all, *Managing Your Money* on-line tutorial and 'Road Map' help you keep track of everything without a business or computer degree!

Managing Your Money ..... **128.**

Communications Software

Compuserve Compuserve Starter Kit	24.	**Insigna** SoftPC	479.
Grolier On Line Encyclopedia	32.	**Software Ventures**	
Compuserve Navigator	45.	Microphone II *(Includes Glue)*	225.
DataViz MacLink Plus with Cable	145.	**Solutions, International** BackFax	129.
Dow Jones Desktop Express	95.	**Synergy Software** VersaTerm	69.
Freesoft Red Ryder V10.3	54.	VersaTerm-Pro	195.
Hayes Smartcom II 3.0	88.	**Traveling Software** LAP-LINK	84.

Word Processors & Desktop Publishing

Access Technology Mind Write 2.0	95.	**Microsoft** Microsoft Word 4.0	249.
Mind Write Express	149.	**Postcraft International, Inc.**	
Allan Bonadio Associates		Laser Fx Font Packs 1-6 ea.	29.
Expressionist 2.0	79.	Laser Fx	114.
Aldus Corporation		**Quark, Inc.** QuarkXPress V2.0	499.
PageMaker 3.0	399.	**Silicon Beach Software**	
Ashton Tate		Silicon Press	41.
FullWrite Professional	269.	**Symantec** More II	Call
Broderbund DTP Advisor	49.	**Symmetry** Acta V2.0	46.
Caere Omnipage	569.	Acta Advantage	69.
Claris MacWrite 5.0	105.	**T/Maker Company**	
Letraset		WriteNow V2.0	109.
Ready, Set, Go! 4.5	279.	**Word Perfect Corporation**	
Letra Studio	369.	Word Perfect	185.
LetraFonts *(Various Vol. 1-45 ea.)*	69.	**Working Software** QuickLetter	79.

Images With Impact! Business 1 by 3G Graphics



Images With Impact! Business 1 is the exciting, useful series of EPS clip-art images for business and industry. You'll have more than 175 images to use with your PostScript compatible programs. Import them into PageMaker or Ready, Set, Go! to enhance your desktop publications. Open *Images With Impact!* with Aldus' Freehand or Adobe Illustrator where you can add color or customize them for your specific needs. Categories of images include symbols, computer and office equipment, people in business, and much more. Everyone can add emphasis and style to any document with *Images With Impact!*

Images With Impact! Business 1 ..... **75.**

Spelling & Grammar Checkers

Aegis Development		**Electronic Arts** Thunder! 1.23	30.
Doug Clapp's Word Tools 2nd Edition	42.	**Lundeen & Associates** WorksPlus Spell 1.1	46.
A.L.P. Systems MacProof 3.0	115.	**Microlytics, Inc.**	
Deneba Software		Word Finder *(Synonym Finder)*	33.
Coach Merriam Webster's Thesaurus 2.0	35.	**Sensible Software**	
Spelling Coach 3.0		Sensible Grammar	***Special*** 54.
(Webster's/Medical/Legal/Hyphenation)	54.	**Working Software** Spellswell 2.0	45.
Spelling Coach 3.0 Professional	109.	Lookup *(Makes Spelling Suggestions)*	30.

Accounting Packages

Aatrix Software		**Layered** Insight One Write	185.
Aatrix TimeMinder	109.	Insight Expert GL, AR, or AP	469.
Aatrix Payroll Plus	159.	**MECA** Managing Your Money	***Special*** 128.
Bedford Software		**Monogram** Business Sense	279.
Simply Accounting	219.	Dollars & $ense 4.0	81.
Chang Labs		**North Edge Software** Timeslips III	117.
New Enhanced Version III Modules!		**Peachtree** Back To Basics Professional	
Rags to Riches Gen. 3-Pak		*(GL/AR/AP/INV)*	159.
(GL/AR/AP)	***Special*** 289.	**Softview** Taxview Planner	45.
Rags to Riches GL, AR, or AP	120.	California or New York Supplements	39.
Dac Software		MacinTax Federal	65.
Dac-Easy Light	45.	**Survivor Software**	
Intuit Quicken	33.	MacMoney 3.0 *(Enhanced Version)*	62.

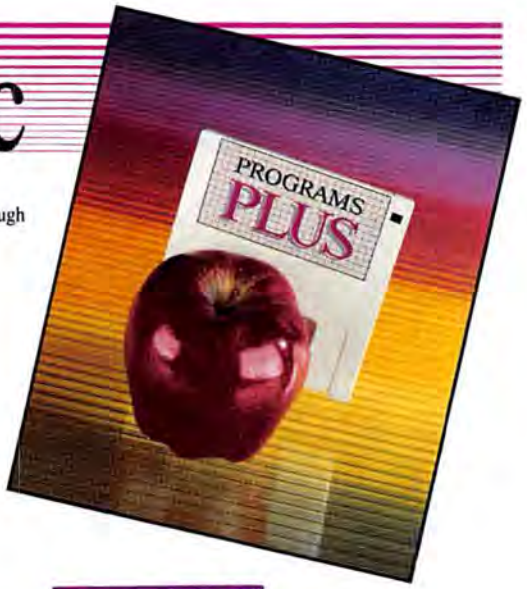
MetaDesign by Meta Software Corp.



MetaDesign is the ideal graphics and text processor for systems designers, systems analysts, project managers, and anyone who needs to display complex relationships in systems of every type. *MetaDesign* understands that objects in a diagram are related and keeps track of them for you. When you move, change, re-size an object, *MetaDesign* automatically updates associated items, putting an end to time-consuming automatic redrawing! Its hierarchical structure lets you manage complex systems in workable modules. Hypertext support allows you to link text across multiple levels and pages, and the case-sensitive Search feature lets you locate what you need no matter which level it resides in. Use *MetaDesign* early in a project to create a basic sketch, and update it easily and quickly as the project evolves!

MetaDesign ..... **199.**

to Polish Up Your Mac



Specials good through
February 28, 1989

Game Software

Access World Class Leader Board Golf	34.	**Microsoft** Flight Simulator 1.02	32.
Accolade Hard Ball or Mean 18	23.	**Micro Sports** MSFL Pro Draft	26.
4th & Inches	24.	MSFL Pro League Football	
Activision Shanghai or Jinxter	24.	or 500 Great Teams	32.
Corruption	30.	**Miles Computing Inc.** Down Hill Racer	24.
Universal Military Simulator or Manhole	32.	Harrier Strike Mission II	
Might and Magic	36.	or The Fool's Errand	27.
Sky Travel	45.	**Mindscape** Balance of Power 1990,	
Artworx Bridge 5.0	22.	Crossword Magic or Citadel	30.
Avalon Hill Mac Pro Football	28.	Deja Vu: A Nightmare Comes True	30.
Broderbund Ancient Art of War or At Sea	27.	King Of Chicago, Shadowgate or	
ShufflePuck Cafe or Ultima III	24.	Joker Poker	30.
Poster Maker Plus	36.	Defender of the Crown, Colony	
Bullseye Software		or The Uninvited	30.
P51 Mustang or Ferrari Grand Prix	32.	**Practical Computer Applications**	
Cassady & Greene, Inc. Crystal Quest	26.	MacGolf or Lunar Rescue	35.
Crystal Quest w/Critter Editor	42.	MacCourses	32.
Centron Crapsmaster,		Road Racer	45.
Roulettemaster or BlackJack Ace	27.	Mac Golf Classics	54.
Discovery Software Arknoid	27.	**Primera** Smash Hit Racquetball II	21.
Electronic Arts ChessMaster 2000	28.	**Sierra On-Line** Leisure Suit Larry	23.
Chuck Yeager Flight Simulator		Space Quest or Space Quest II	29.
or Life & Death	32.	Police Quest	29.
Starfleet I	37.	**Silicon Beach Software**	
Scrabble	26.	Dark Castle or Apache Strike	27.
One-On-One, Pinball Construction Set,		Beyond Dark Castle	27.
Seven Cities of Gold, SkyFox, or		**Sir-Tech** Mac Wizardry	35.
Patton vs Rommel	15.	**SoftStream, Inc.** Colour Billiards	35.
EPYX Sub Battle Simulator *(Mac or MacII)*	29.	Mac Man or Solitaire DA	24.
Hayden Software Sargon IV	29.	**Sphere, Inc.** Tetris	20.
Infinity Software, LTD.		GATO, Orbiter or Pt-109	26.
Go or GrandSlam Tennis	27.	Solitaire Royale *(Mac or MacII)*	20.
Infocom Leather Goddesses of Phobos		Falcon 2.0	32.
or Hitchhiker's Guide	15.	**Studio Zero** Orbital Mech	29.
Beyond Zork, Zork Trilogy or QuaterStaff	30.	**XOR Software** NFL Challenge	59.
Zork Zero	38.	Pro Challenge or Basketball Challenge	29.

Rags to Riches '3-Packs' by Chang Labs



Rags to Riches is the flexible and powerful modular accounting system that's winning praise from accountants and reviewers nationwide. Now, Chang Labs offers its popular *Rags to Riches '3-Packs'* at a special price and with a special bonus! Each '3-Pack' offers the user flexible reporting, batch totals for any time period, user definable accounting cycles, and impressive speed. When you need to analyze, graph or present your accounting information, just export it to your favorite program! As a special bonus, if you choose the '3-Pack' that suits your needs before February 28th, 1989, *Programs Plus* will send you an Aatrix Payroll program, absolutely FREE!!

Rags to Riches 'General 3-Pack' *(G/L, A/R, A/P)*..... **289.**
Rags to Riches 'Pro 3-Pack' *(G/L, Pro. Bill., A/P)*..... **359.**
Rags to Riches 'Retail 3-Pack' *(G/L, Inventory, A/P)*..... **359.**

Modems

Abaton InterFax 12/48	345.	**Practical Peripherals**	
Anchor Automation		Practical Modem Mini 1200SA	79.
MacPac 2400E w/software & cable	179.	Practical Modem 1200SA	109.
Epic		Practical Modem 2400SA	181.
Epic 2400 Int. SE	315.	MacCommpack	
Epic 2400 Int. Mac II	315.	*(2400SA w/Microphone II & Cable)*	229.
Epic 2400 Mini Ext.		**Prometheus**	
(Hayes Compatible)	155.	Promodem 2400M Ext.	
Everex Emac 2400 Baud	225.	*(Software & Cable)*	199.
Hayes Microcomputing		Promodem 2400	
Smartmodem 1200	299.	*(Hayes Compatible)*	309.
Smartmodem 2400	449.	**Supra Corporation** Supra Modem 2400	149.
MDIdeas Commlink 2400	189.	**U.S. Robotics**	
Migent		Courier 1200 *(Hayes Compatible)*	199.
Migent Pocket Modem		Courier 2400 *(Hayes Compatible)*	349.
(ext. 300/1200 Baud)	115.	Courier 2400E *(Hayes Compatible)*	379.
Novation Novation Parrot 1200	109.	Courier HST 9600 *(Hayes Compatible)*	689.

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Utility Software

ALSoft Disk Express	35.
Font/DA Juggler Plus	42.
Berkeley System Design Stepping Out II	52.
CE Software QuicKeys *(Macro Program)*	53.
Central Point Software Copy II Mac	20.
PC Tools Deluxe Mac	45.
Emerald City Software LaserTalk	187.
Fifth Generation Systems Suitcase II	44.
FastBack For The Macintosh	54.
Power Station	32.
HJC Virex	*Special* 69.
Icom Simulations On Cue	36.
TMON	89.
Infosphere Liaison	129.
Microlytics, Inc. GOfer	45.
Microseeds Redux	65.
ScreenGems	49.
Olduvai Software Icon-It! or MultiClip	39.
Read-It! TS *(For Thunderscan)*	79.
Read-It! O.C.R. 2.0 *(For Image Scanners)*	199.
PCPC HFS Back-Up 3.0	54.
Softworks Stack Cleaner	32.
HyperTools 1 or 2	65.
SuperMac Software SuperSpool 5.0	54.
SuperLaserSpool 2.0	82.
Diskfit 1.4	54.
Sentinel 2.0	155.
Symantec MacSQZ!	49.
Symantec Utilities for Mac *(S.U.M.)*	59.
Williams & Macias	
myDiskLabeler w/Color	31.
myDiskLabeler w/LaserWriter Option	34.
Working Software	
Findswell 2.0 *(Document Finder)*	36.

Printers & Digitizers

Digital Vision Computer Eyes-Mac	209.
Koala Technologies Corp.	
MacVision 2.0 *(Digitizer)*	225.
Kurta IS ADB Tablet	255.
Cordless 4 Button Cursor	95.
Seikosha SP1000 *(Imagewriter Comp.)*	235.
Summagraphics Bit Pad Plus	329.
ThunderWare	
ThunderScan V4.0 with Power Port	199.
Mac II Power Accessory	42.

Macinware SE Ext. Carrying Case by I/O Design



The ***Macinware SE Ext. Carrying Case*** protects your Mac SE, Plus, or 512K and its extended keyboard in safety and style. It's made of rugged 1000 Denier Dupont Cordura nylon, and surrounds your machine with a full half-inch of high-density foam padding. There's room for an external hard drive, a mouse, cords, and disks, so your complete system travels with you in one compact unit. All stress points are cross-box stitched for added safety. A convenient shoulder strap is included, and you can choose platinum grey or navy blue colors.

SE Carrying Case ..... **76.**

DataBase Management

Acius 4th Dimension	489.
4D Runtime	239.
Activision Reports for Hypercard	75.
Focal Point & Business Class Bundle	65.
City To City	30.
Apple Computer HyperCard	42.
Ashton Tate dBASE Mac 1.0	295.
Blythe Software Omnis 3 Plus/*Express*	129.
Borland Reflex Plus	165.
Claris FileMaker II	239.
Fox Software Fox Base Plus	208.
Microsoft Microsoft File 2.0	119.
Nordic HyperCONTROL	42.
Odesta Double Helix II	339.
DataDesk Professional	289.
GeoQuery	199.
Software Discoveries RecordHolderPlus	45.
TENpointO FocalPoint II	125.

Educational/Creative Software

Ars Nova Practica Musica	79.
Barron's Barron's SAT	35.
Bible Research The Word (KJV or NIV)	165.
Bogas Productions Studio Session	49.
String Quartet, Country or Heavy Metal	15.
Super Studio Session	79.
Bright Star Technology Alphabet Blocks	32.
Talking Tiles	69.
Broderbund Clip Sounds	36.
Jam Session or Black & White Movies	30
Sensei Geometry, Calculus or Physics	59.
Type!	20.
Where in the World is Carmen SanDiego?	25.
Coda Mac Drums	32.
Perceive	65
Davidson & Associates Speed Reader II	39.
Math Blaster or Word Attack!	27.
Electronic Arts Mavis Beacon Typing	36.
Venture's Business Simulator	47.
Deluxe Music Construction Set V2.0	61.
1st Byte/Electronic Arts Kid Talk, Speller	
Bee, First Shapes, or Math Talk	32.
Great Wave Software KidsTime	26.
Number Maze	27.
Crystal Paint	41.
Individual Typing Instructor Encore	26.
Learning Company Reader Rabbit	33.
Mindscape Perfect Score SAT	
w/The Perfect College	46.
Niles & Associates End Note	85.
Nordic MacKids Educational Programs *(ea)*	28.
Simon & Schuster Typing Tutor IV	35.
Springboard Top Honors	59.
Family Matters or Atlas Explorer	28.

Sensible Grammar by Sensible Software



Sensible Grammar takes the drudgery out of proofreading your documents, so you can devote more time to creating perfect documents. It's simple to check your documents for thousands of common grammar and style errors. Informal, overly formal, vague, wordy, chiche and sexist are detected. So are punctuation, capitalization, verb tense, verb agreement, and many other types of errors. All are displayed on screen, along with suggested corrections, and an editing window so you can make corrections quickly. *Sensible Grammar* also allows you to customize its checking so you can adapt it to your needs with just a few keystrokes. Make the sensible choice in proofreading software, *Sensible Grammar.*

Sensible Grammar ..... **54.**

Disk Drives/Hard Disks/Upgrades

Applied Engineering MacRAMS	
(1 MB SIMMS Mac+, SE, II)	489.
AST Research	
Mac286 Co-Processor *(Mac II)*	Call
CMS	
Compact Series SC30 *(Mac+/SE/II)*	649.
Compact Series SC45 *(Mac+/SE/II)*	859.
SD Series MacStack SD20 *(Mac+/SE/II)*	569.
SD Series MacStack SD60 *(Mac+/SE/II)*	849.
Cutting Edge Cutting Edge 800k Drive	175.
Cutting Edge Wedge XL 30	
Plus SCSI Hard Drive	629.
Cutting Edge Wedge XL 45	
Plus SCSI Hard Drive	829.
Cutting Edge XL 30 Internal Hard Drive	505.
Cutting Edge XL 45 Internal Hard Drive	645.
Dove Computer Corporation	
Marathon 020 Accelerator	
MSE 1 (16 Mhz)	585.
MSE 2 (16 Mhz w/1MB)	*Special* 1059.
MSE 3 (16 Mhz w/Math Co-processor)	779.
MSE 4 (16 Mhz w/1MB & Math Chip)	1255.
MacSnap 524 *(512K to 1MB)*	315.
MacSnap 524E *(512E to 1MB)*	305.
MacSnap 524S *(512E to 1MB w/SCSI)*	379.
MacSnap 548 *(512K to 2MB)*	459.
MacSnap 548E *(512E to 2MB)*	549.
MacSnap 548S *(512E to 2MB w/SCSI)*	599.
MacSnap Plus 2 *(MacPlus to 2MB Non Expandable)*	439.
MacSnap 2SE or 1024 Option *(1MB or MacII Memory Exp.)*	439.
SCSI Interface/Port	109.
MacSnap Toolkit *(torx driver, opener & grounding set)*	15.
Everex Emac 20D *(20Mg Hard Disk)*	520.
Emac 20 Deluxe	585.
Personal Computer Peripherals	
Beige or Platinum Color. Optional Built-In Modems Available.	
MacBottom HD-21 *(20+MB SCSI Hard Disk)*	659.
MacBottom HD-32 *(32MB SCSI HD)*	699.
MacBottom HD-45 *(45MB SCSI HD)*	859.
MacBottom HD-70 *(70MB SCSI Hard Disk) Plat only*	999.
Rodime Rodime 20 Plus Ext.	629.
Rodime 45 Plus *(Ext. 45MB SCSI)*	939.
Rodime 450RX *(Int. 45MB Mac SE/II)*	829.
Rodime 100 Plus *(Ext. 100MB SCSI)*	1169.
Rodime 140 Plus *(Ext. 140MB SCSI)*	1319.
Rodime 1000 RX *(Int. 100MB MacII)*	1045.
Video Technology	
Laser 800k External Drive	185.

Marathon MSE-2 by Dove Computer



Marathon MSE-2 is the accelerator and memory expansion board that brings speed and power to your Macintosh SE. Because the *Marathon MSE-2* features a 68020 32-bit 16 MHz microprocessor, your favorite programs will run up to 400% faster! And the 1 Megabyte on-board memory expands the existing memory, so you'll be able to run MultiFinder and many other memory-hungry applications! The software programmable on-board CMOS LCA controller chip, on-board expansion slot, and optional 68881 math co-processor option allow future expansion and ensure compatibility. When productivity and flexibility are important, go the distance with Dove's *Marathon MSE-2!*

Marathon MSE-2 ..... **1059.**

Shipped Federal Express

Business Software

Abacus Concepts StatView II *(Mac+, SE, II w/68020 & 68881)* 349.
StatView SE+ Graphics 229.
Access Technology Trapeze 2.1 159.
Ashton Tate Full Impact 249.
Borland Eureka! The Solver 129.
BrainPower ArchiText 182.
StatView 512 Plus 175.
Math View Professional 145.
DataScan 118.
Bravo Technologies MacCalc 79.
Chang Laboratories
C.A.T. Contacts•Activities•Time 229.
Claris MacProject II 395.
Cognition Technology MacSMARTS 135.
D2 Software MacSpin 2.0 189.
Individual 101 Macros For Excel 37.
Legisoft WillMaker 3.0 35.
Lundeen & Associates
WorksPlus Commands 59.
Mainstay Capture 42.
Mac Flow 2.0 or Mac Schedule 115.
Meta Software MetaDesign *Special* 199.
Micro Planning Software
Micro Planner 6.0 325.
Microsoft Microsoft Works 2.0 189.
Microsoft Excel 1.5 249.
Satori Software
Bulk Mailer 3.2 79.
Bulk Mailer Plus 195.
Components GL 389.
Select Micro Systems, Inc.
Exstatix or MapMaker 219.
Shana Enterprises
Fast Forms 89.
Softworks Client 129.
Synex Mac Envelope 4.0 59.
Mac Invoice 32.
Systat Systat 3.2
(Specify MacPlus, SE or Mac II) 459.

Virex by HJC Software



Virex is the solution to the threat of Macintosh computer viruses. *Virex* is the only program that detects *and repairs* infected programs and system files! If you need to eradicate an existing virus from your infected system, or want to protect your system from future infection, *Virex* is the safe, effective product that does the job. Its icon driven approach and on-line help make it easy to learn and use. *Virex* combats all known Macintosh viruses and HJC Software plans to update the program to combat new viruses. Registered users will be notified of updates and can subscribe to HJC's inexpensive upgrade service.

Virex ..... **69.**

Graphics Software

3G Graphics Images With Impact! 59.
Images With Impact Business 1 *Special* 75.
ABA Software Draw It Again Sam 2.0 79.
Graphist Paint II 289.
Adobe Systems Adobe Illustrator *88* 319.
Adobe Fonts *(Various volumes)* Call
Aldus Freehand 349.
Altsys Corp. FONTastic Plus 2.0 54.
Fontographer 2.2 239.
Ashton Tate Full Paint 69.
Broderbund Print Shop or Clip Charts 36.
Drawing Tables 79.
CE Software Calendar Maker 3.1 27.
Claris MacPaint II 105.
MacDraw II 309.
Cricket Software Cricket Draw 169.
Cricket Paint or Pictograph 99.
Cricket Graph 119.
Cricket Presents 289.
Deneba Software Canvas DA 1.0 56.
Canvas 2.0 *(Includes Desk Accessory)* 169.
Dream Maker
MacGallery *(Hypercard or Paint)* 28.
Cliptures 97.
Dubl-Click Software
World Class Fonts: Various Vol. 1-6 *(ea)* 45.
WetPaint: Various Vol. 1-16 *(ea)* 45.
Electronic Arts Studio 8 *(MacII)* 319.
Enzan-Hoshigumi USA
MacCalligraphy 2.0 105.
Japanese Clip Art Call
Foundation Publishing Comic People 25.
Comic Strip Factory 44.
Generic Software Generic CADD 54.
Graphsoft Mini Cad 4.0 375.
Innovative Data Design Dreams 315.
MacDraft 1.2B 149.
Laserware Laserpaint Color II 359.
Letraset
ImageStudio 1.5 or StandOut 279.
Macromind Videoworks II 175.
Videoworks II Accelerator 118.
Videoworks II Driver for Hypercard 61.
Micro Illusions Photon Paint 179.
Micro CAD/CAM MGMStation 685.
Micro: Maps
MacAtlas Paint 2.0 *(MacPaint Format)* 45.
MacAtlas Hyper Atlas 64.
MacAtlas Professional
(PICT/MacDraw Version) 129.
Microsoft Microsoft PowerPoint 2.0 249.
Olduvai Software
Post-ART II *(4-Disk Set)* 59.
ArtFonts 1, 2 or 3 59.
Silicon Beach Software
SuperPaint 2.0 109.
Digital Darkroom 157.
Super 3D 157.
Solutions International
The Curator *(Catalog Your Art)* 79.
Springboard Certificate Maker 24.
Works of Art Assortment,
Holiday, or Education 28.
Works of Art Laser Art or Fonts 59.
Springboard Publisher 109.
SuperMac Software Pixel Paint 209.
Symmetry
Picture Base & Wet Paint Bundle 95.
T/Maker Click Art Letters I, Letters II,
Personal Graphics, Effects,
Business Image, or Holidays *(each)* 28.
Christian Images 35.
Click Art EPS Illustrations 75.
Zedcor DeskPaint 2.0 69.

Accessories

Abaton ProPoint *(ADB Mouse for Mac SE & Mac II)* 99.
Asher Engineering
Turbo Trackball *(Mac & Mac+ or Mac SE & Mac II)* 69.
CH Products Mirage: Quad or ADB
(Turns Joystick Into Mouse) 39.
Mach IV Plus: Quad or ADB 65.
Curtis Manufacturing
Emerald-Surge Suppressor-SP-2 36.
Ruby-Surge Suppressor-SPF-2 55.
Cutting Edge Cutting Edge EADB-105
Keyboard *(Mac SE & Mac II)* 135.
DataDesk
MAC-101 Keyboard/Beige
(128k/512k & MacPlus) 139.
MAC-101 ADB Keyboard/Platinum
(Mac SE & Mac II) 139.
Ergotron Mousecleaner 360° 15.
MacTilt *(Mac, SE or II)* 68.
Farallon
MacRecorder Sound System
(Mac SE or Mac II) 139.
Impulse Audio Digitizer w/soundware 145.
I/O Design *Mac Luggage in Navy*
Macinware Plus Carrying Case 64.
Macinware SE Carrying Case *Special* 76.
Imageware II Carrying Case 49.
HDware 54.
Kalmar Designs
Teakwood Roll-Top Disk Cases:
Micro Cabinet *(holds 45 disks)* 14.
Double Micro Cabinet *(holds 90 disks)* 21.
Triple Micro Cabinet *(holds 135 disks)* 31.
Kensington External Disk Drive Cover 8.
Extra Long ADB Keyboard Cable 25.
Macintosh II Stand 20.
Macintosh II Monitor Extension Cable 33.
Mouse Pocket *(Reg. or ADB)* 8.
Mouseway *(Mousepad)* 8.
ImageWriter or ImageWriter II Cover 9.
Macintosh Plus/SE Dust Cover 9.
Macintosh SE w/extended Kybd Cover 9.
Mouse Cleaning Kit w/Pocket 17.
Disk Drive Cleaning Kit 20.
Tilt/Swivel 22.
Apple Security Kit 34.
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Modem/Fax Protector 10 15.
Modem/Fax Protector 20 29.
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Printer Muffler Stand *(80 & 132)* 24.
Printer Muffler 80 43.
System Saver Mac *(Beige or Platinum)* 64.
Super Base 34.
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New Turbo Mouse *(Reg. or ADB)* 119.
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Moustrak MousePad 7"x9" Size 8.
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Grappler L/Q or Grappler L/S 92.
Ribbons
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ImageWriter Black 6-pack 20.
ImageWriter Rainbow Pack *(6 Colors)* 20.
ImageWriter II-Four Color Ribbon 9.
ImageWriter LQ Black 17.
ImageWriter LQ Four Color 20.
Seikosha Ribbon Black 6.
Silicon Comforts MacChimney
(Very Effective Cardboard Laminate Convection Cooling Device) 16.
Smith & Bellows
Mahogany Disk Case *(holds 96)* 30.
Sopris Softworks
High Trek Carry Cases - Platinum Gray, Navy
Imagewriter II Case 49.
Macintosh Plus, SE w/Standard Kybd 59.
Macintosh SE & Extended Kybd Case 69.
Targus Imagewriter II Carry Case Blk. 49.
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Deluxe MacPlus-XKB Blk. 69.

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Centech 3½" DS/DD Color Disks *(10)* 19.
Sony 3½" DS/DD Disks *(box of 10)* 19.
Fuji 3½" DS/DD Disks *(box of 10)* 19.
Maxell 3½" DS/DD Disks *(box of 10)* 20.
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Mainstay V.I.P. 2.5
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As a matter of fact, MacWorld called Redux "almost fun backups." (Sep88)

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Redux by Dave Winzler

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PINSTRIPE

MiniFinders section for more information, and keep an eye out for in-depth reviews.

MORE II (Symantec). The original presentation software for the Macintosh has been extensively revised to bring its capabilities in line with the other presentation packages available while retaining its unique features for "idea processing." At its heart, with many word-processing features, is a powerful outliner that is wrapped in one of the most comprehensive presentation facilities available. Tree charts and bullet charts are still available, but so is a complete drawing environment for making any kind of slide, overhead, or screen presentation.

At the heart of MORE II is a powerful outliner with many word-processing features; tree and bullet charts are still available as well as a complete drawing environment.

DataPak (Mass Micro). Backup has always been a major problem, but this removable 45-megabyte cartridge hard disk system with a very fast access time almost makes backing up a pleasure. The drive technology was developed by Syquest, and several companies manufacture the drive units. Cartridges made on one company's drive can be read by any other company's drive. The Mass Micro version is excellent, but you can't go wrong no matter whose you buy. For backup, archival storage, and even for use as just another hard disk, the Syquest drive is outstanding.

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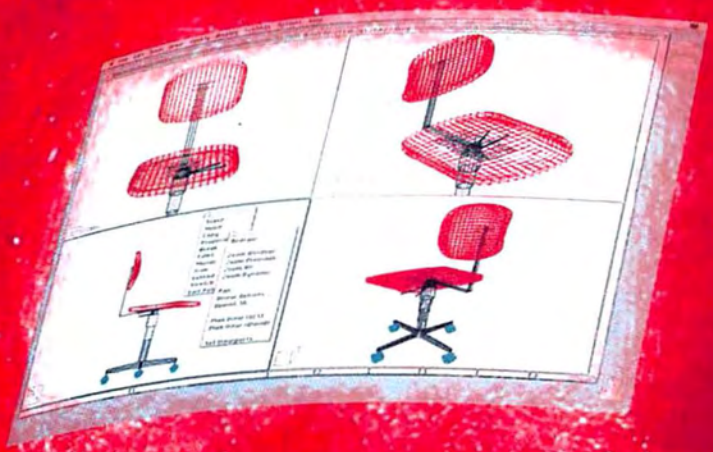
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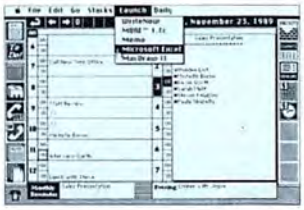
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Making the Upgrade

Know how to build a better mousetrap? Adopt a cat. Know how to build a better Mac? Now that's more complicated.



ILLUSTRATION: MARK W. SWEENEY PHOTOS: PETER A. GOULD

BY JOHN J. ANDERSON AND KRISTI COALE

From desktops nationwide, there emanates a yearning. More. Better. Faster. You, yes, you, may be among the afflicted. Watch for the warning signs. Have you gnawed your fingernails to the nub waiting for documents to print? Do you talk to your Mac while you're waiting for it to finish some lengthy operation? Have you ever tapped on the screen, as if to admonish the electrons to run along?

You long for memory, storage, speed, color. If you have these things, you long for more of each. Some day soon now, you're going to make that next big jump. You're going to add, expand, improve, enhance. You're going to have the biggest, hottest, coolest, toughest Mac on the block.

Enhancing your Mac can develop into an obsessive pastime. It indulges the desire for power, while providing the satisfaction of mowing down deficiencies, whether real or imagined.

And then there's the fact that some people really and truly do need to upgrade their Macs.

I COULD ENHANCE ALL NIGHT

Enhancement is a good thing, but it does have its shortcomings. And there are more mundane concerns than the mere exhaustion of one's financial reserves. Certain enhancements actually conflict with each other, causing potentially nasty results. On the software side, you might find your Mac actually runs slower or that it crashes periodically because of an overdose of cdevs, DAs, or INITs. On the hardware side, enhancements might be incompatible, or simply physically unable to occupy the same space at the same time. We're reminded of Daniel J. Boorstin's admonition that although technology is fun, we can also drown in it.

COMPOUNDED CONFUNDITY

It's uncommon to reflect on 1984 as the Mac's Good Old Days, but Mac users don't sufficiently acknowledge some of the advantages we had back then.

Yes, it was a closed machine, underpowered and overtaxed. But there were advantages as well as disadvantages to that. There was one machine and one version of System software. Hardware expansion was a nonissue. A scant 128K of RAM enforced Spartan discipline: Programmers had to carefully allocate resources and economize code.

Now, with a megabyte as the minimum RAM standard for the Mac Plus, SE, and II, programmers have become less conscientious. Do we see a trend toward memory-hungry, feature-laden programs that don't make full use of all their own components? It sometimes seems that way. We wonder whether most programmers still consider what the user really needs, in contrast to what they can contrive to stick in.

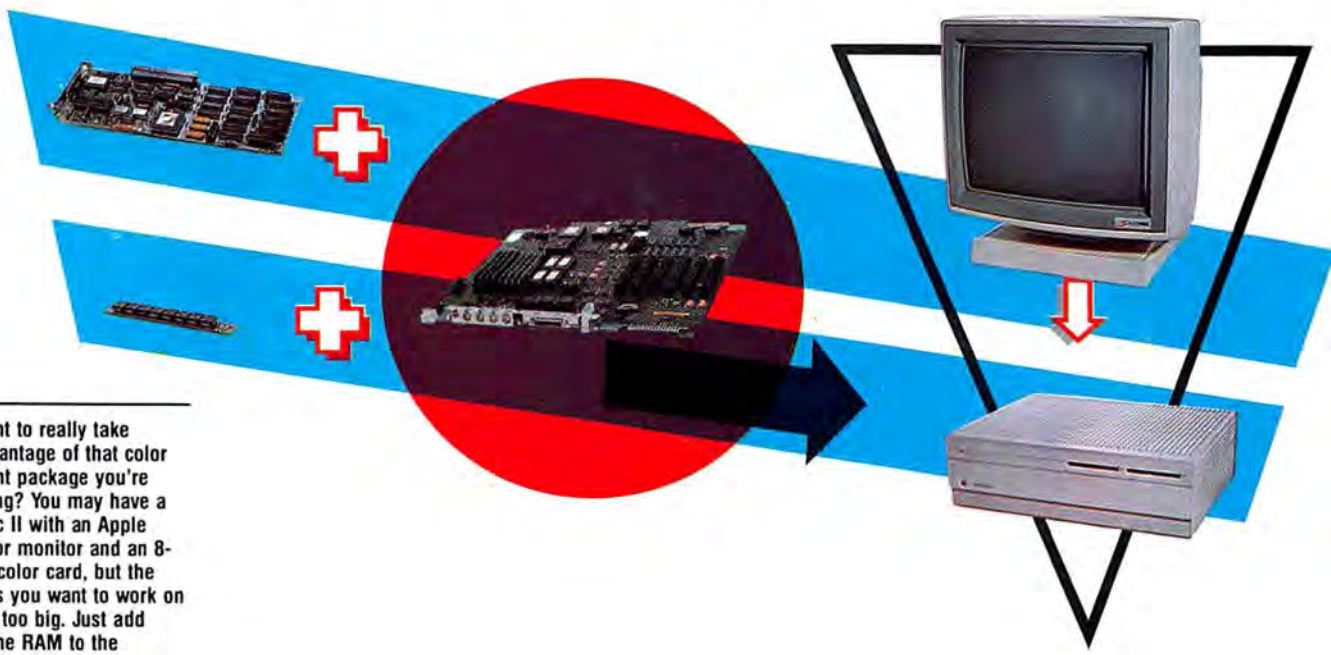
But there is more than enough blame to go around. Compounding the problem are the countless revisions to system software that Apple has churned out in the past two years. Certain versions of programs work only with certain versions of the System and certain versions of the Finder. Many packages that work with System 5.0 and its predecessors won't work with System 6.0. Conversely, some new packages have been designed to work only with System 6.0. So if you have an earlier System, you're out of luck. This kind of problem used to plague only the other (bluish) guys. Now it's our problem too.

It's hard to blame a programmer for not following rules that have changed so often and in some cases so radically. And let's not forget that the more complex any system becomes, the more likely it is to fail.

YEARNING YOUR KEEP

So much for the hymn to simplicity; enriching your machine is where it's at in today's Mac community. This is not to endorse, however, system expansion as a macho end in itself. Enhancement should never be a matter graded solely on whose Mac has more under the hood. The goal is to make the Mac the best machine for *your* specific needs. Only then are you justified in reaching for whatever groovy gadgets are available to help you do just that.

It's easy to see how one could get



Want to really take advantage of that color paint package you're using? You may have a Mac II with an Apple color monitor and an 8-bit color card, but the files you want to work on are too big. Just add some RAM to the motherboard.

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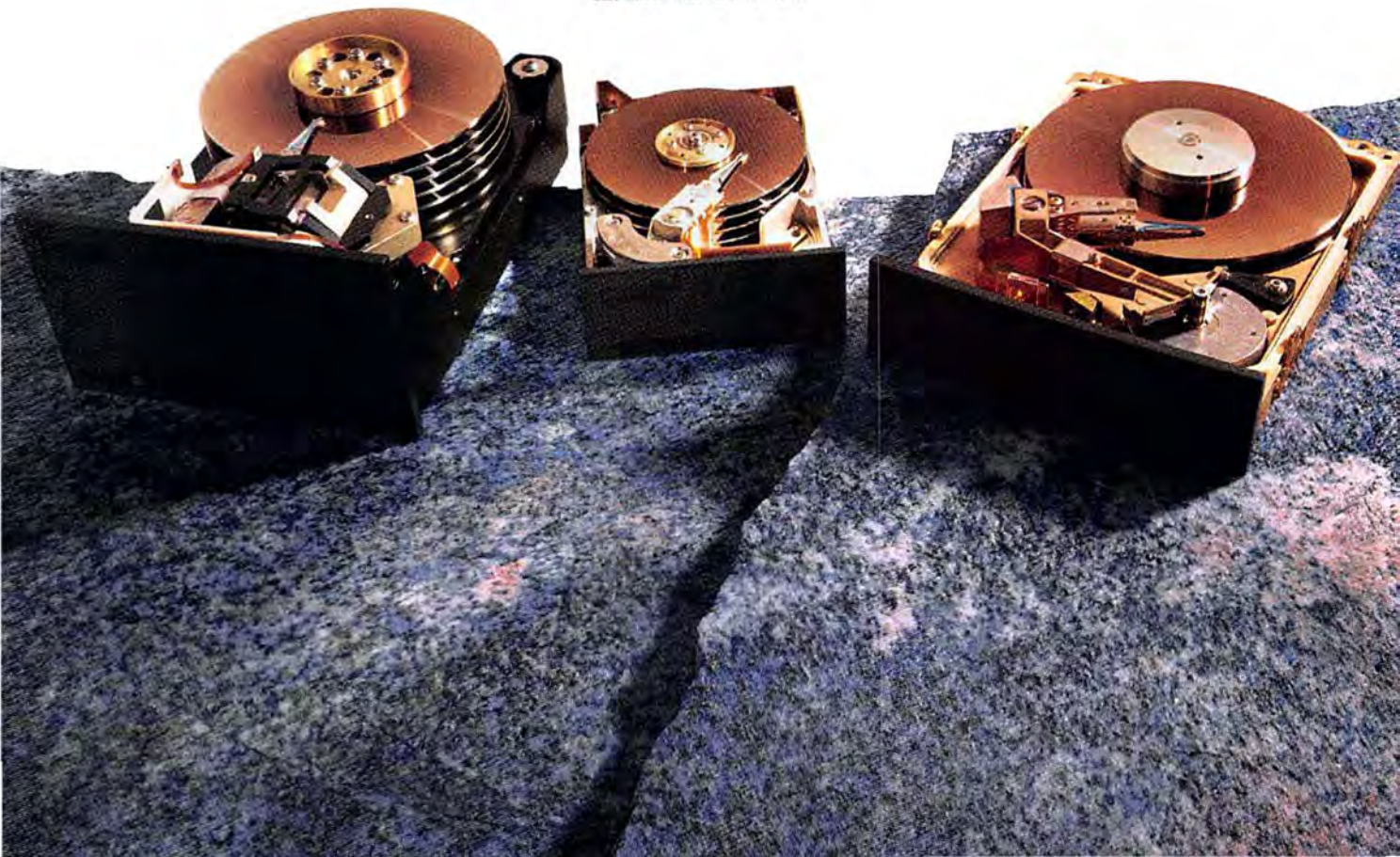
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carried away, however, given enough monetary resources. It can be difficult to "just say no" to 8 megabytes of RAM, a Mitsubishi 35-inch color monitor, or an image-capture board, if you can swing it. We're talking state-of-the-art technology, after all, where improvements come to market practically every day. That's right, every day. Remember that accelerator board you bought last week? History. It's a snail alongside the card that will ship tomorrow. Need to find a quick way to go broke? If you really come down with the yearning, it's nearly as effective as an arms race.

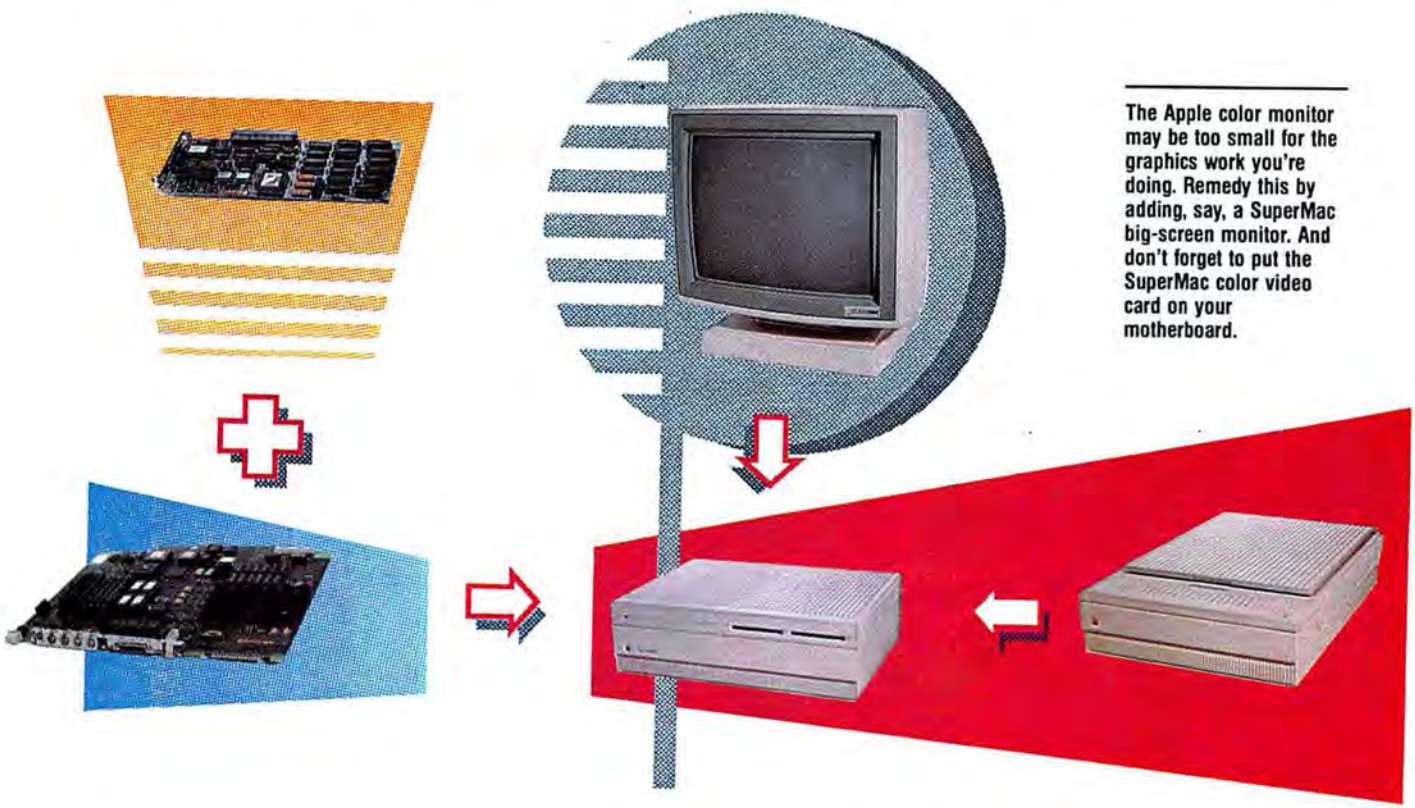
CLOGGED ARTERIES

When finally committing to upgrade, you'll need to look carefully at potential bottlenecks in system operation. Say you want to speed up an inherently slow operation like printing. Your Mac, and therefore you, gets tied up waiting for a document to print (time to gnaw the paws). You'd like to have your computer free to work on one project while printing another. Installing a spooler in your printing system is the way to placate your fingernails — sending your document to a print buffer, thereby freeing your Mac for your continued use. If you're running MultiFinder, you can print in the background while working on something else.

Another frequent pinch comes with disk I/O (input/output). A RAM cache can boost performance in this respect, quickly and dramatically. Cache memory is a small, fast bed of memory that serves the CPU. The CPU can dispatch interim operations in this buffer, which is more easily and quickly accessible than conventional RAM, and immensely preferable to reading or writing from disk. Apple includes this option in the Control Panel of the Mac, and some applications (especially graphics programs) sport their own versions of this feature. However, you should note that by defining a RAM cache, you subtract directly from available conventional RAM. Like our government, the Mac sometimes has budgetary problems, such as allocating too little RAM for too many functions. And like our government, the most attractive solution involves throwing money at the problem.

Cache or no cache, if you're working with graphics or audio files of a megabyte or more in size, you need more RAM. Along with adding a hard disk, upgrading RAM memory capacity is probably the most common way to beef up a Mac. You'll have to shop around, but the SIMM (single in-line memory module) market is finally loosening up ($375 to $400 per megabyte in the San Francisco Bay Area at press time). Make sure you buy from legitimate SIMM dealers. Stay away from "pay now, ship later" operations. (For more on upgrading your memory, see "The Persistence of Memory" in this issue.)

Even the humblest of hard disks are indispensable Mac performance boosters. Time, in relation to hard disks, is dependent on more than one variable. Though it might seem counterintuitive, the larger hard disks perform the fastest. A Jasmine Direct Drive 160, from Jasmine Technologies, San Francisco, is among the fast-



The Apple color monitor may be too small for the graphics work you're doing. Remedy this by adding, say, a SuperMac big-screen monitor. And don't forget to put the SuperMac color video card on your motherboard.

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est of the big disks (see the MacUser Labs report in the June '88 issue). It sells for a stiff $2,899. If that's more than you need, try the Jasmine Direct Drive 80 for $1,399 or the Mass 40 from Mass Micro Systems, Sunnyvale, Calif., which lists for $899.

Bear in mind that the way you yourself operate affects hard disk speed, too. Over the course of a hard disk's lifetime, you'll write, delete, and rewrite many files. This causes *fragmentation,* a condition where pieces of files are scattered all over a disk — which slows normal reading and writing operations significantly. There are special utilities designed to overcome the problem of fragmentation. Alternatively, back up your drive to another device, erase the drive in question, and then rewrite its contents.

BUILDING FOR SPEED

If you really want your Mac to patch out, you'll want to consider an accelerator board. A real boon to productivity, not to mention to the antsy Mac user, an accelerator board can make operations such as compiling or sorting a humongous database much less painful. Accelerator boards can build strong Macs four ways: by providing a speedier CPU, by making that CPU more fully featured, by adding more memory, and (if the board includes a bundled math coprocessor) by giving a boost to floating-point math operations. (For more information on accelerator boards, see this month's MacUser Labs report, "Maximum G-Force.")

We can't fail to mention muscle building in the realm of displays either. You can hook up a large-screen monitor, such as one from Radius (San Jose, Calif., $1,995 for full-page display; $2,395 for two-page display) for a better view of things.

If you have a Mac II or IIx and want more color capabilities, you can upgrade to 24-bit color. With 24-bit color, your screen is capable of displaying 256 colors simultaneously from a palette of more than 16 million. To get 24-bit color, you'll have to get not only a monitor capable of displaying it but also a video card structured to provide your Mac II with the power to generate it. PCPC, Tampa, Fla., has a 19-inch monitor (the PCPC II) that comes with its own custom card (CGC/2) that sells for $4,995. But why stop there? Follow through with color hard copy: Consider a QMS ColorScript 100 ($24,995) from QMS, Mobile, Ala., or the more moderately-priced 4693D Color Printer from Tektronix, Beaverton, Ore. (a mere $8,495).

SOCIAL ACCELERATION

If you're on a network, you'll have to dodge some more monkey wrenches during your efforts at acceleration. One such wrench results from the network growing too large. You can improve the situation by upgrading your file server, moving, say, from a Plus or SE to a Mac II. You can choose to split up your network into zones among several servers. This reduces the work load of an individual server. You can also divide your network and join the parts with a local bridge. One such product is the Netbridge from Shiva, Cambridge, Mass. ($499), which helps to expand an AppleTalk network. The Interbridge from Hayes, Norcross, Ga. ($799), will do the same thing.

Using a different network system can also resolve bottlenecks. Although many have knocked AppleTalk for being too slow, by itself it's not a major blockage for a network system. On the contrary, when used with the right signal-generating hardware, AppleTalk can speed things up considerably. When you're struck down by node-to-node combat, consider CheckNET ($59.95) from Farallon Computing, Berkeley, Calif., or Q-Talk from Laser Connection ($59), which is a subsidiary of QMS.

Transmitting information over phone lines is another networking concern. For example, consider two university departments on campuses hundreds of miles apart. How do they get information to and from each other? They can use a standard modem with typical telecommunications software, such as Smartcom II or Red Ryder. Another solution might be a CO-LAN (Central Office Local Area Network) system. Through ordinary phone lines, parties can transfer data at a rate of 19.2 kilobits per second. Note that

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transmission at this speed usually requires a conditioned line, which can be expensive.

The advent of fiber optics makes possible a whopping advance in the transfer rate of data over small cables. Du Pont's Fiber Optic LAN Extender ($350) can transfer data at a rate of 230.4 kilobits/second. The system is immune to electromagnetic or radio frequency interference, and the signal doesn't dissipate over distance. If it's speed you seek in a LAN, nothing's faster than networking with light.

PLAYING THE SLOTS

The jacks-of-all-trades on the Mac II are its NuBus slots. NuBus gives the Mac II a convenient, solid expansion platform that ensures the continuing ability to adapt to evolving technology. (For more information on NuBus, please see the feature, "Hop on NuBus, Gus," in this issue.) You can slip in, say, an image-capture board (such as one from Data Translation, Marlboro, Mass., for $995) and work with NTSC (National Television Standards Committee) video. Color-capture boards let you do the same thing, only in color. There are even boards to enhance your Mac's communication capabilities with IBM mainframes (MacIrma from DCA, Alpharetta, Ga., and MacMainframe from Avatar, Hopkinton, Mass.).

Speaking of endless capabilities, NuBus can handle up to 16 boards. But how to do that when the Mac II has only six internal slots? With the Expanse II ($1,995) NuBus expansion chassis from Second Wave, Austin, Tex., you can. The Expanse II is an eight-slot chassis that hooks up to an interface board that you plug inside your Mac II. That eats up one Mac II slot, but you're still left with 13 free slots for various cards. Shipping by the time you read this, Expanse II also has three internal and two external SCSI ports.

A SMALL MATTER OF MONEY

So far, we've emphasized the cash-intensive enhancements for your Mac. But if dollar signs block the path toward souping up your machine, you might consider these economical alternatives.

Lose the Finder. There are other file-management applications, some used in conjunction with desk accessories, that can replace the Finder and reduce the number of anxiety attacks you experience waiting to move to and fro. PowerStation from Fifth Generation Systems, Baton Rouge, La. ($59.95), is a solid Finder alternative. It has startup capabilities and can launch other applications. With one click, you can get right to your most important data files, as PowerStation automatically groups applications with the files they create. DiskTop from CE Software, Des Moines, Iowa ($49.95), is a DA that will also let you launch programs from within it. You can also make new folders and copy files from within other programs. Probably the best feature of this DA is that you can find other files on any drive.

For those who don't want to shell out a couple of grand for a larger monitor but who feel that nine inches simply is not enough, there's a software alternative: Stepping Out II from Berkeley System Design, Berkeley, Calif. For $95, you can extend your screen as far as memory allows, creating a virtual screen within a screen.

PRACTICAL MAC'S PERFECT

Enhancing your Mac is hot, it's cool, it's wet, it's dry, it's sweet, and it's bittersweet. It should also emphasize what's practical. Having more horsepower means nothing if your Mac continually crashes or flakes on you. Enhance gradually. Solve problems by finding the bottlenecks, the real deficiencies, and ironing them out one by one. Your additions should make your Mac, and you, more efficient, more powerful, and quicker on the draw. They should give your fingernails a fair chance to grow back, and your coworkers renewed faith in your sanity.

But wait. What about the 68040? Real soon now.

WHEN THEY'RE NOT THINKING UP NEW WAYS TO UPGRADE THEIR MACS, KRISTI COALE AND JOHN ANDERSON CREATE NEW WORDS IN AN EFFORT TO CONFUSCATE THINGS FOR THE MACUSER COPY EDITORS.



You think Mac II owners find their screens too small? The SE screen has its shortcomings when it comes to size, especially where DTP is concerned. Try a Radius monitor that displays single or double pages. For more input capabilities, hook up an Apple CD-ROM drive. Not only can you use this setup to look at HyperCard stacks and other items, but you can also play standard compact discs, using your Mac screen as the control panel for track selection. (The Radius monitor card is not pictured; it fits into a slot on the SE's motherboard.)



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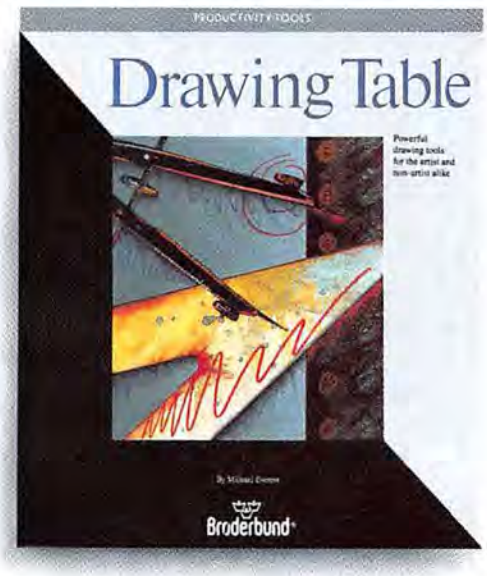
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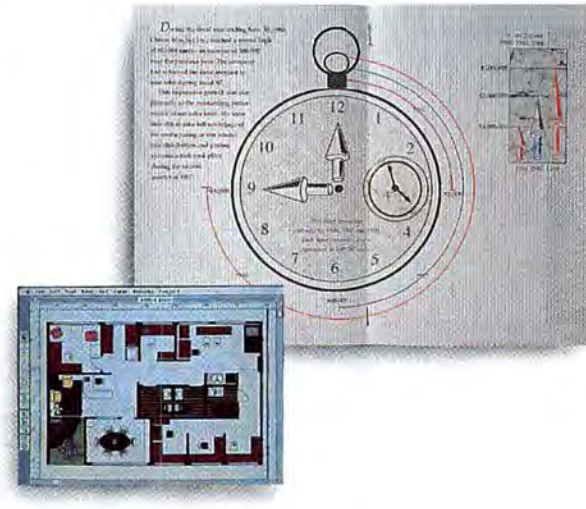
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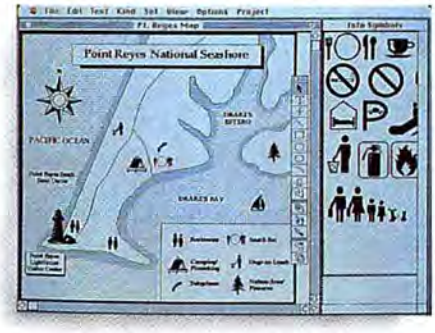


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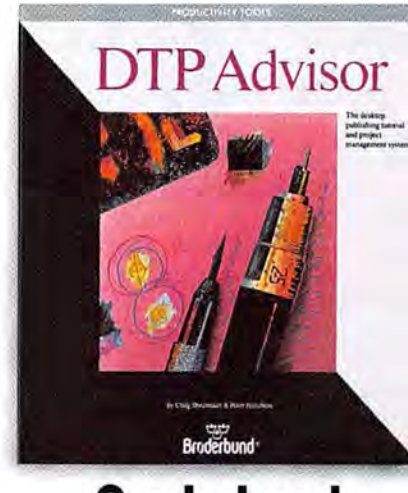
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Hop on NuBus, Gus

There may be fifty ways to cleave your buffer, but NuBus is the bridge over troubled waters.

It stung. The Macintosh — in all its glory, its heady promise for the future — was closed shut, locked up like a medieval virgin. The Lord of Cupertino had taken steps to ensure his loved one's chastity.

A mistake. A mistake made all the more stinging by the fact that the Apple II built its success on its very expandability — six expansion slots, each patiently waiting for some third-party manufacturer to leap into the breech. But no, no expansion slots for the Mac. And, we were told, there never would be. If it was expandability you sought, then the Lisa was the machine for you.

Then we lost our Jobs.

In 1987, the sting was over. The Mac II reopened Pandora's box. The Macintosh had finally, irrevocably, and officially lost its innocence. Documentation of the Mac II's nonproprietary expansion-slot architecture was shared freely, encouraging outside support for expansion and enhancement of Macintosh computers.

When Apple decided to reopen the case, it first considered how best to do so. This involved getting behind a bus, and by this we don't mean sucking on an exhaust pipe. The multiconnector jack into which you plug an accessory card is also called a *bus:* a mechanical and electrical linkage system used to connect auxiliary processing, storage, and control devices to a computer. New input/output (I/O) capabilities, processing functions, disk controllers, video input and output, and extra RAM are just a few of the possible means of expansion.

GETTING PRETTY ANSI

After arduous study, Apple chose an industry standard bus, known formally as ANSI/IEEE Std. 1196-1987, aka *NuBus.* The NuBus was conceived in the late 1970s at the Massachusetts Institute of Technology (MIT) and was developed with 32-bit machines specifically in mind. Since then, Western Digital and Texas Instruments corporations, as well as the IEEE itself, have pursued the standard's further development.

Today's bus standards reflect attempts to redress the problems of earlier-generation buses, notably that of the original IBM PC (which itself

BY BILL NOWLIN AND JOHN J. ANDERSON

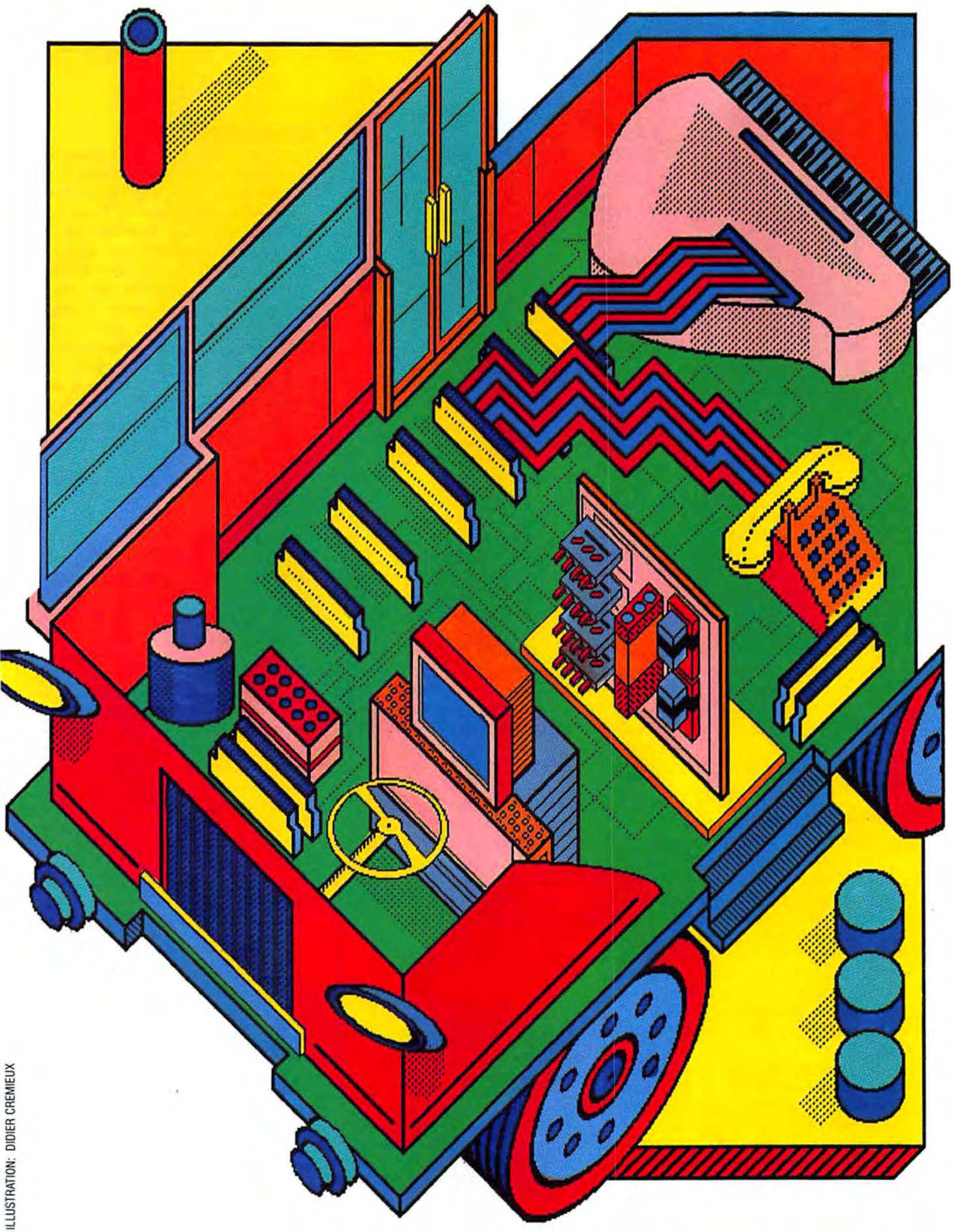


ILLUSTRATION: DIDIER CREMIEUX



PC/AT board: Multiple configurations can cause multiple headaches.

was modeled to some degree on that of the Apple II). High on the list of technical objectives are simplicity, performance, processor independence, and ease of use. As we'll see, achieving a balance of simplicity and performance can be tricky.

Comparison of competing bus standards is a reasonable means of moving along the learning curve, and that's what we propose to do here. Specifically, we'll be building toward a face-off between NuBus and the Micro Channel Architecture (MCA) of the IBM PS/2 line.

PHYSICAL ENDOWMENT

Electrical engineers have a saying: "The bigger the board, the bigger the bang." Generally speaking, this is true, though application-specific integrated circuits (ASICs) such as gate arrays, and surface-mount technology have shown that there's more to satisfaction than size alone. Even so, a card must be big enough to accommodate all of the required components but still small enough to fit within a desktop machine.

If we compare the maximum sizes of plug-in cards in the PC, PC/AT, Micro Channel, and NuBus formats, the most striking statistic is the size of the Micro Channel card — it's drastically smaller. A growing lament from plug-in board manufacturers is that it's *too* small. There isn't enough room to put sufficient functionality on a Micro Channel card. The answer lies in going with ASICs and surface mounts. Doing so lets a manufacturer use fewer and more compact components. Unfortunately, this usually increases development time — and costs. Surface-mount technology is also more expensive in all but the very highest of high-volume boards. For the user, this means either less functionality using conventional parts or the higher price of surface-mount devices (SMDs). Or both.

The clear advantage of a smaller board size is that you can build a smaller computer. And in high-volume situations, such as those in which IBM most likes to envision itself, cost differentials would tend to equalize. However, in its rush to miniaturize, IBM may have shot itself in the footprint, at least for the short term.

STICKY FINGERS

All the IBM buses use edge-card connectors, which employ small, conductive areas on the edge of the card, sometimes called *fingers.* These fingers plug into the computer's *backplane:* a printed circuit board with connectors and signal paths that connect to corresponding connector pins. Each backplane connector defines a single card slot, where a single plug-in card may reside. (The Mac II backplane is the logic- or motherboard itself.) Receptacles on the IBM backplane accommodate these fingers by using a loaded-spring–type pin to make contact with the conductive area on the edge of the plug-in card.

In contrast to the IBM-style buses, NuBus uses a single, industry-standard 96-pin DIN connector. Each slot is capable of accommodating 8-, 16- or 32-bit cards. The DIN connector was developed specifically for backplane applications and is generally considered more reliable than edge card connectors.

FORM FOLLOWS UNCTION

The number of different card sizes now available for a particular PC-bus computer causes confusion for IBM's third-party manufacturers as well as for users. Every manufacturer designs its board to plug into as many computers as possible — which, for IBM PC–type machines, usually means a low-performance 8-bit card, since the 8-bit slot is the lowest common denominator. With NuBus, however, a single connector style services every board.

Another physical problem that

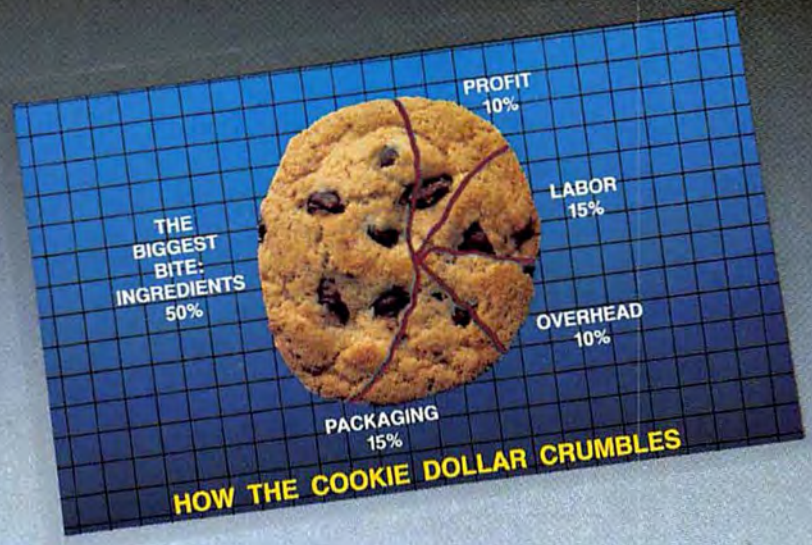
Right Nowlin

When we wanted to get in touch with a NuBus expert, we went directly to National Instruments, developer and manufacturer of plug-in cards for data acquisition and instrument control. That's where we found Bill Nowlin, NuBus maven extraordinaire.

The National Instruments card Bill Nowlin is most proud of is the NB-DMA-8-G, which provides the Macintosh II with a powerful, 32-bit, 8-channel DMA controller. The DMA card can be used with other National Instruments NuBus cards using a board-connect bus called the Real-Time System Integration (RTSI) bus. The RTSI bus allows the other cards to request DMA transfers, as well as providing additional bused signals for test and measurement and data-acquisition applications, such as trigger and clock lines.

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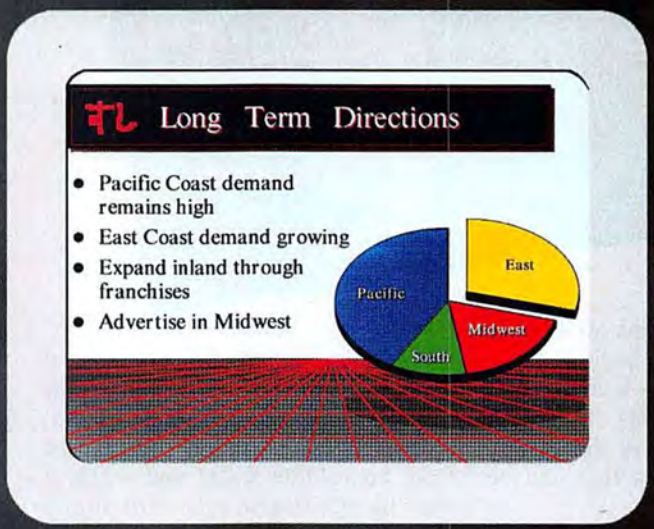
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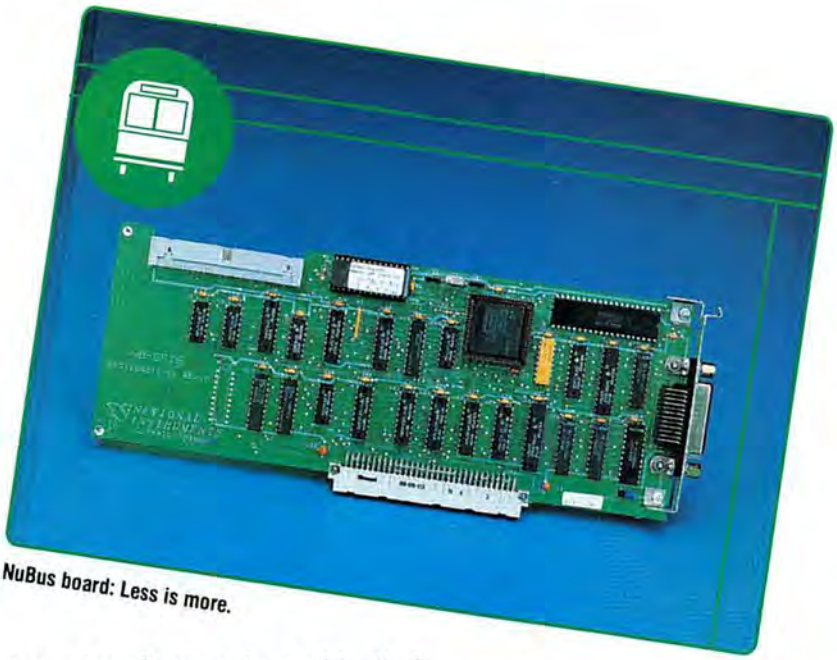
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NuBus board: Less is more.

many manufacturers have with all of the PC-style designs — including NuBus — is the area available on the back panel for I/O connectors. The small area limits the number of signals and the types of connectors that can be used.

SO GO CONFIGURE

Are you still with us? Take a deep breath. It's easy enough to understand why all the cards in a computer's backplane must be configured properly: They have to function without interfering with the operation of any other cards or devices that share the bus. Cards need to be flagged to their slots, and a CPU needs to be flagged to its resource cards.

Configuration for a PC or PC/AT card usually means manually setting the base address for that card, as well as indicating what interrupt lines and direct memory access (DMA) channels it uses. This is normally accomplished through DIP switches or jumpers on the card. A user usually has to refer to a detailed set of instructions (and perhaps a pair of bifocals) in order to configure a card properly. A great way to kill time.

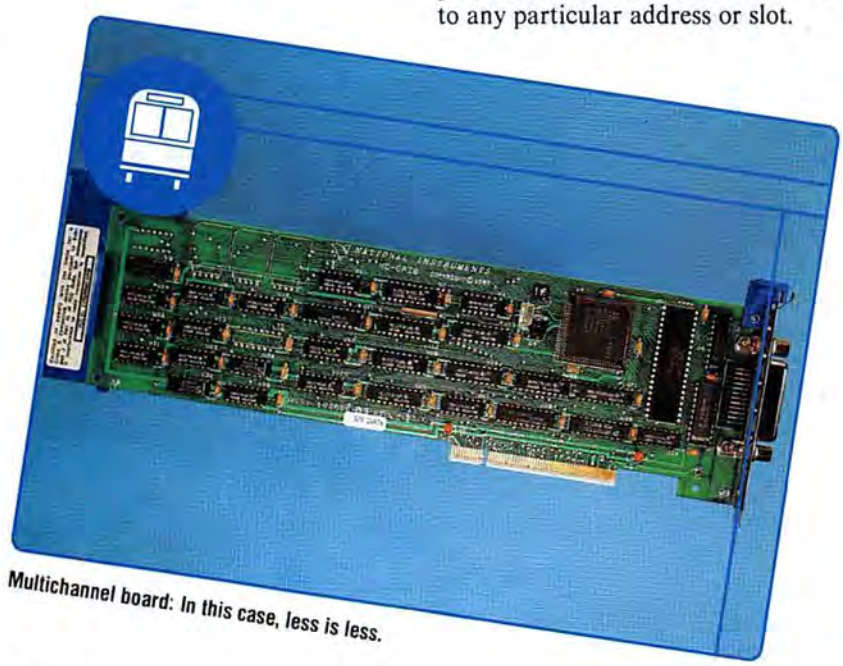
But let's be fair. IBM has its own "new bus." The Micro Channel uses a new mechanism called Programmable Option Select (POS) to establish a plug-in card's base address, interrupt, and DMA channels. Add-in card-configuration information is stored on the computer's motherboard in a special nonvolatile memory. At power-up, the central processor (80286 or 80386) reads the configuration information from nonvolatile RAM and writes it into the registers on each card. Pretty hot stuff. The processor gets to each card using a special set of I/O addresses, which each card has to recognize. But this critical configuration information, stored in nonvolatile RAM, is programmed by the *user* each time there is a card change on the bus, using a special boot-floppy and POS utility program. Typically, card manufacturers supply with each card a diskette that can be used to help in the configuration process.

Micro Channel, therefore, merely transforms hardware-controlled configuration into software-controlled configuration. You can drop your pencil, but the ghosts of those DIP switches will still appear on-screen.

With NuBus, you don't need to flip a DIP to tell a card what slot it's in. NuBus uses a technique called *geographic addressing,* in which each card slot simply carries a unique address. The address is communicated to the plug-in card using four designated pins on the NuBus connector.

Sounds simple, and it is. Each board, when it is plugged in, inherits the address of the geographic card slot in which it resides. Then it's Miller time — no special utility needed. The connectors on that backplane have their identification information built right in.

NuBus also provides an autoconfiguration mechanism that goes far beyond establishing the base address for each card. Upon power-up, the configuration of the system is comprehensively and automatically determined by simply reading and interpreting configuration ROMs. This method of autoconfiguration ensures slot independence, so boards aren't restricted to any particular address or slot.



Multichannel board: In this case, less is less.

Invoicit

Yes, there is a new storm brewing–and you asked for it! It's Invoicit, the new MacMoney invoicing module. And it's from the folks at Survivor Software.



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STRIKE UP THE BANDWIDTH

The bandwidth of a communications channel can be thought of as the size of a pipeline between two reservoirs. The larger the diameter, the more gallons per minute can pass between the reservoirs. Similarly, the larger the bandwidth, the more information can pass between two devices.

Bandwidth in modern buses is measured in millions of bytes per second (megabytes per second). It is proportional to how long it takes to perform a single read or write operation across the bus, which is called a *bus cycle.* The longer the microprocessor takes to communicate with the cards plugged into it, the more slowly the overall system runs.

By today's standards, the original IBM PC and PC/AT buses were quite slow (1.2 megabytes per second and 4 megabytes per second, respectively), while the maximum transfer rates for the MCA and NuBus are 20 megabytes per second — ten times as fast. NuBus also offers a special 37.6-megabyte-per-second block-mode transfer capability that the other three buses do not have. That capability remains untapped in the current generation of Mac IIs.

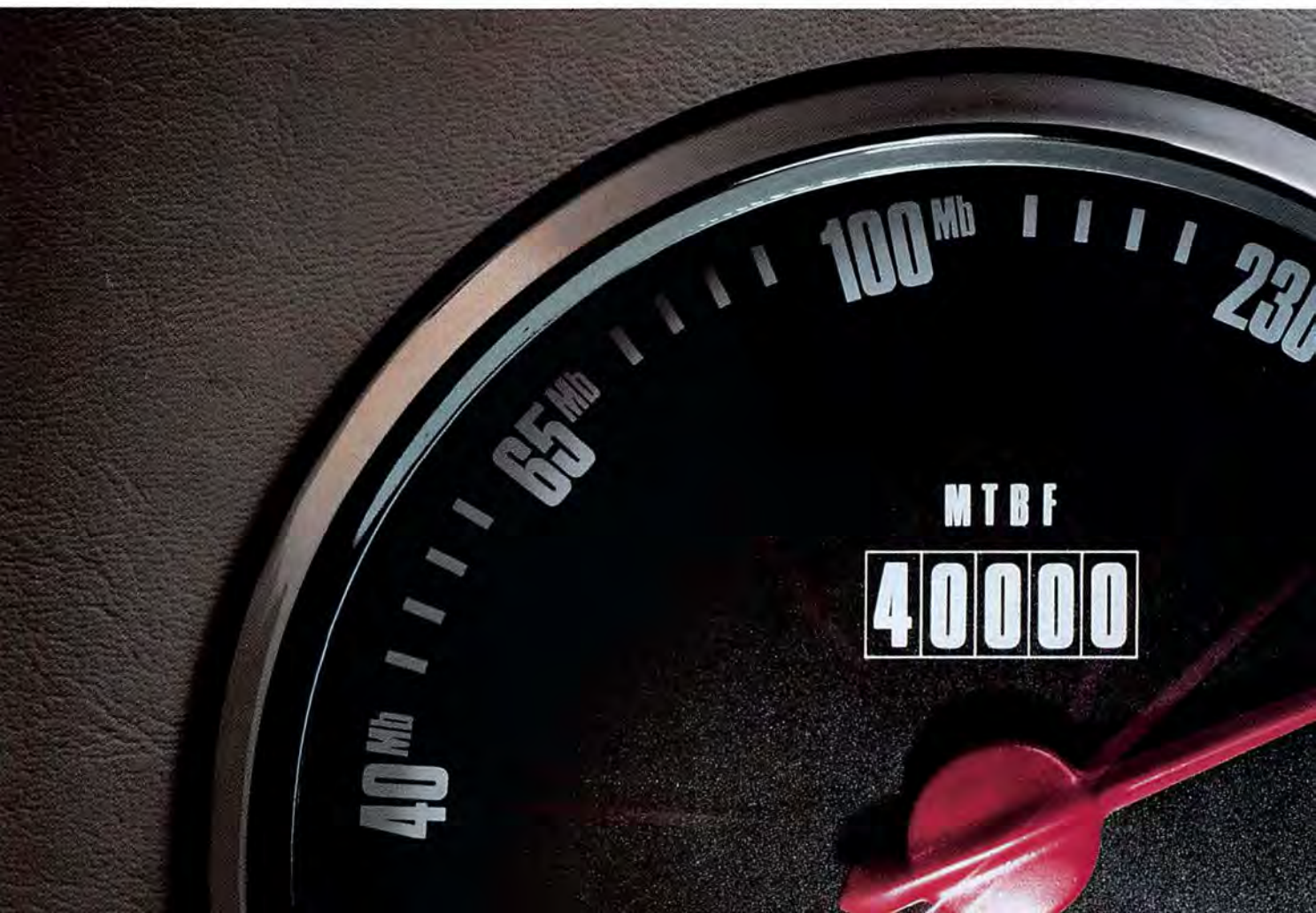
Actual bus-cycle time, however, may be much slower than these maximum rates, since actual speed is dependent on how fast the microprocessor is running, how fast the RAM is, how efficiently the microprocessor is interfaced to the bus, and whether the data path is 8, 16, or 32 bits. Remember also that brute speed does not tell all. A Harley-Davidson may be quite fast, but that doesn't mean you'd want to use it to haul freight.

INDENTURED SERVICE

The modern bus can service multiple master devices as well as multiple slaves. A master can be a general-purpose microprocessor, an application-specific processor such as a digital signal processor (DSP), or a DMA controller, among others. Master devices can assume complete control of the bus when their cycle comes around, or even retain control of the bus through several cycles. Slaves are normally memory cards and I/O devices that serve their masters.

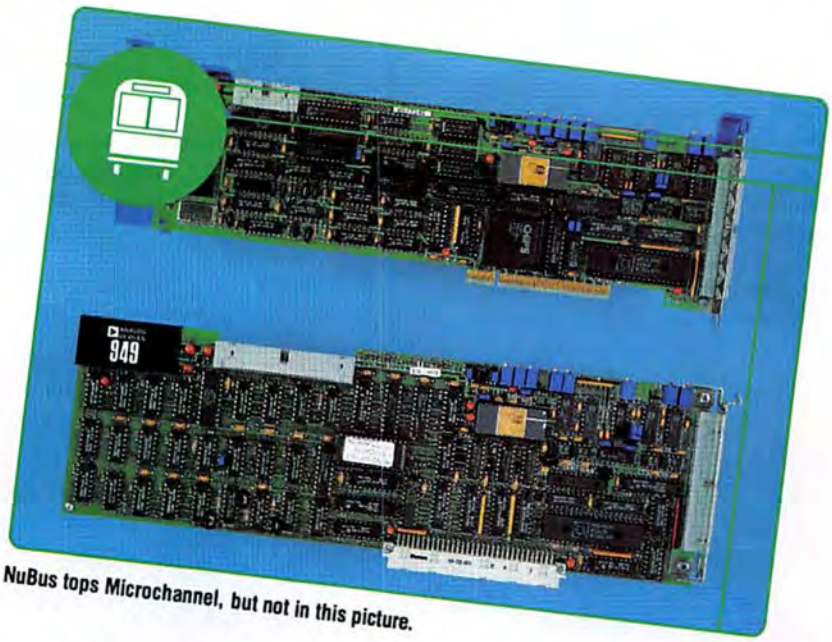
When several master cards are simultaneously plugged into the bus, they will compete for its use. All buses have a mechanism for dealing with this contention, called *arbitration.* Masters use arbitration to determine which one shall win the bus for what period of time. Methods used for arbitration vary from bus to bus, as does the period of time that a single master may retain ownership of the bus.

Both the NuBus and the MCA are true multimaster buses. Each allows up to 16 master cards per backplane. The standards differ in one significant respect, however. Apple NuBus is a



full *system bus;* the Mac II logic board itself can be said to occupy a virtual "seventh slot" on the bus. In contrast, the Micro Channel bus — as the progeny of earlier PC and PC/AT buses — retains a semblance of CPU dependency. It is a modified *local bus.*

The original PC bus allows no masters other than the main microprocessor on the backplane. The IBM PC/AT bus allows up to seven masters.



NuBus tops Microchannel, but not in this picture.

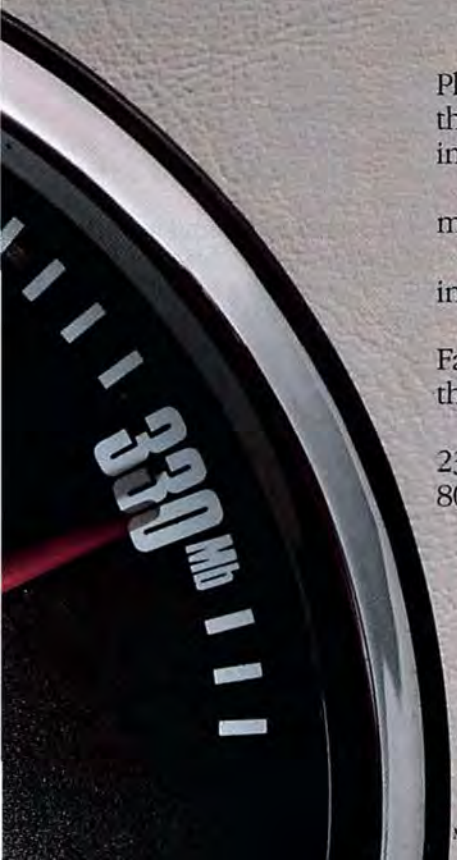
EQUAL OPPORTUNITY DEPLOYMENT

The NuBus was designed to ensure that any processor could be interfaced to the bus — unlike the Big Blue world, which was constructed specifically for Intel's chips.

Processor independence is important in bus architecture, because by the time any microprocessor is in production, it's obsolete. A tough fact to face, but a truth of this wacky industry of ours. A robust bus architecture must be designed with the future in mind — and that means next-generation processors.

The IBM PC bus is essentially designed to support the 8088, and in some cases, the 8086. The PC/AT bus supports the 80286, and in some systems, the 80386. Other non-Intel processors face real difficulty interfacing to these two buses, since the signals and timing are custom tailored to the Intel family. Sounds rather like discrimination.

In this respect, IBM's MCA is similar to the IBM PC and PC/AT buses.



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The signals, and to some extent the timing, remain tightly coupled to the family of Intel processors. It is possible to interface other families of microprocessors to the MCA bus, but not without great effort.

The NuBus already interfaces with a broad range of microprocessors from several different manufacturers. It was built with just such flexibility in mind.

GROUP HEX

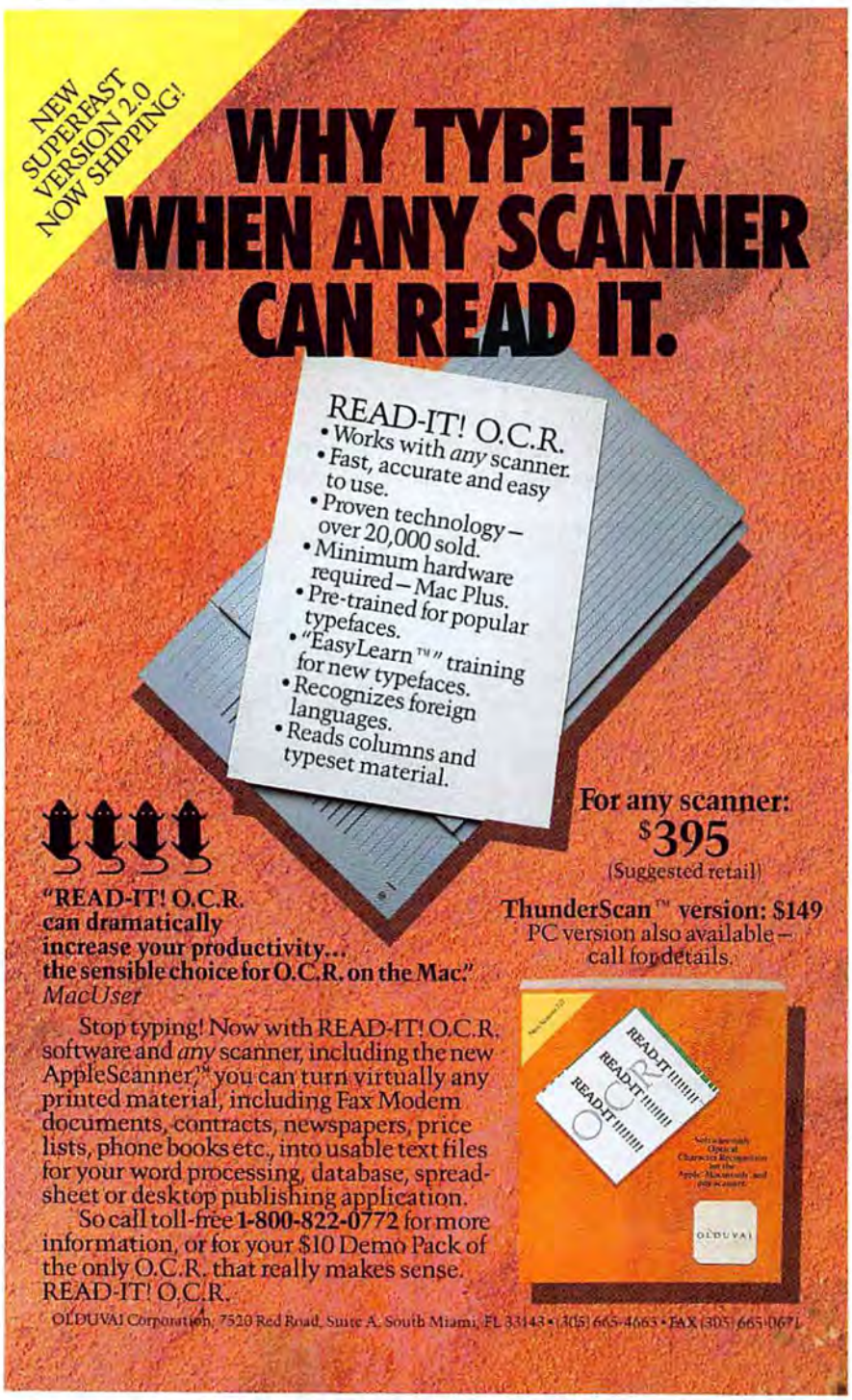
Thanks to ever-more-powerful microprocessors, personal computers today have the performance and capabilities of yesterday's mainframe computers. But nearly all applications today are implemented to run on a single processor. What if that were to change?

A close look at the cards that you plug into your machine will reveal that a good number of them are already equipped with their own microprocessors. These CPUs are typically dedicated to performing application-specific tasks, usually relating to some I/O or peripheral control function. More powerful versions of these micros sport the ability to take complete charge of the backplane bus and access memory themselves, without having to ask for help from another central processor. This is one reason why a Mac II can do such a fair imitation of a PC.

Now imagine multiple microprocessors running simultaneously, all plugged into the same backplane and all communicating with each other and sharing the computational load. This is the promise of *multiprocessing*. As NuBus was designed with the future in mind, it supports multiple processors. NuBus incorporates a fair arbitration scheme to prevent resource and computation *starvation* (when one or more cards "hogs" the bus to the detriment of other cards). NuBus also incorporates virtual interrupts, which allow bus access to be dynamically configured and shared among several microprocessors.

This dynamic configuration is one of the shining areas where the geographic addressing and automatic configuration of NuBus really come into play. NuBus also offers *bus locking* and *resource locking*, two critical mechanisms that fully empower multiple master CPUs while preventing them from corrupting each other's data. Bus locking allows a master card on the bus to hold the bus for a specified number of cycles. Resource locking prevents shared resources, such as RAM, from being interfered with by competing processors.

Micro Channel lacks a defined method of resource locking. Whether this omission from the MCA standard will inhibit its future remains to be



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NuGroup on the Menu

NuGroup is the NuBus manufacturer/user group that was formed to promote the use of NuBus and to provide continuing technical support of and improvements to the standard. If current interest and activity is any indicator, the NuBus will be the next major bus standard for 32-bit workstations and industrial systems, as well as playing a major role in personal computing. Membership in NuGroup offers you a complimentary IEEE-1196 specification, minutes from all meetings, a mailing list of all participating companies, inclusion in all press releases, a product directory, technical and promotional committee membership, voting privileges, and participation in the development of a business plan for 1989 and beyond. For more information, contact NuGroup, 13762 Newport Ave., Suite 204, Tustin, CA 92680; (714) 669-1201.

— John J. Anderson

seen. Its current specification undeniably inhibits true multiprocessing capability on the PS/2 system.

Today, however, there are only a few experimental applications that utilize multiprocessing on the Mac II — for example, digital-signal-processing microprocessors that help perform vector math computations. But the Mac OS itself does not currently make use of any NuBus multiprocessing capabilities.

So why give a hoot about multiprocessing? Because it represents an irresistible way to increase performance significantly, without having to move to more advanced (and more costly) microprocessors. It's also an excellent means to provide application-specific computation power to a main computer. For example, by adding an 80386 card to your Mac II, you could run OS/2 code in a window alongside your Mac applications. Now there's a concept.

IF U CN RD THS, YR STL RDING

It's probably safe to assume that only the hard-core hot rodders have stayed with us up to here, so we'll let out all the stops and spill the beans about DMA. A DMA controller is a device that is designed specifically for moving data within a computer. It can typically perform multibyte transfers from memory to memory or between I/O devices (cards) and memory. The alternative to using a DMA controller is to program the microprocessor to do the transfers using fetch-and-deposit instructions. Microprocessors are usually significantly slower at these tasks than a DMA controller. Most DMA controller designs also allow the data transfer to take place simultaneously with microprocessor execution (this is called *cycle stealing*), thereby allowing the microprocessor to continue servicing the keyboard, mouse, video screen, and so on, while simultaneously improving overall performance of the system.

All of IBM's personal computers have a multichannel DMA controller on the backplane that plug-in cards can use to transfer data independently of the microprocessor. The IBM PC bus provides cards with three 8-bit DMA channels. The PC/AT has four 8-bit and three 16-bit DMA channels. All of the MCA computers have an 8-channel DMA controller capable of 8-bit or 16-bit transfers.

The Mac II, however, has no DMA controller on its backplane, and whether this is a deficiency depends on just what you are trying to accomplish. If you must have it, full-bore DMA can be performed, however, using a plug-in NuBus card (see sidebar, "Right Nowlin") or by designing the DMA controller and the associated bus master circuitry onto any card that needs to perform DMA transfers.

Bear in mind that the ADB (Apple Desktop Bus) standard allows keyboard, mouse, and all manner of input peripherals to continue polling independently at all times. Implementing the special 37.6-megabyte-per-second block-mode transfer configuration will obviate some needs for DMA as well. On balance, this is one of those areas in which simplicity is preferable to hardwiring into specification new features that burden as well as bless.

Both the Micro Channel and the NuBus represent fresh thinking about bus architecture. Both support high-speed 32-bit microprocessors, memory, and I/O devices; automatic card configuration without jumpers; and multiple cards. And both have open, published specifications (though MCA's is proprietary). The older PC and PC/AT buses undeniably fall into the category of stale technology.

There is, however, a downside to NuBus. DMA is a standard feature on the Micro Channel but an option on the NuBus. It should be noted that, based on current prices, implementation of a simple slave card in NuBus format is more costly than one designed for the PC, but it's roughly equal in price for MCA. And while NuBus is gaining ground, the PC bus has a big lead in availability, which goes a long way in some folks' minds when determining winners. There are, however, currently over a hundred suppliers/developers of NuBus cards, and that number is growing. There is also a NuBus manufacturer/user group called NuGroup that has compiled a list of NuBus board developers and manufacturers (see sidebar, "NuGroup on the Menu").

Let's tally the score: Micro Channel offers a custom edge-connector; multiple versions of its bus; smaller board area; integral DMA on the backplane; and no specification for resource locking. NuBus offers an industry-standard pin connector, a single standard bus, larger board area, no integral DMA, and both bus locking and resource locking.

It's clear to the authors, at least, that, in a showdown between MCA and NuBus, NuBus wins. Neither of us can claim complete objectivity, for we both have an interest in the furtherance of the NuBus standard. But we'll say it anyhow: NuBus is superior. If you disagree, we heartily recommend you go out and purchase a PS/2.

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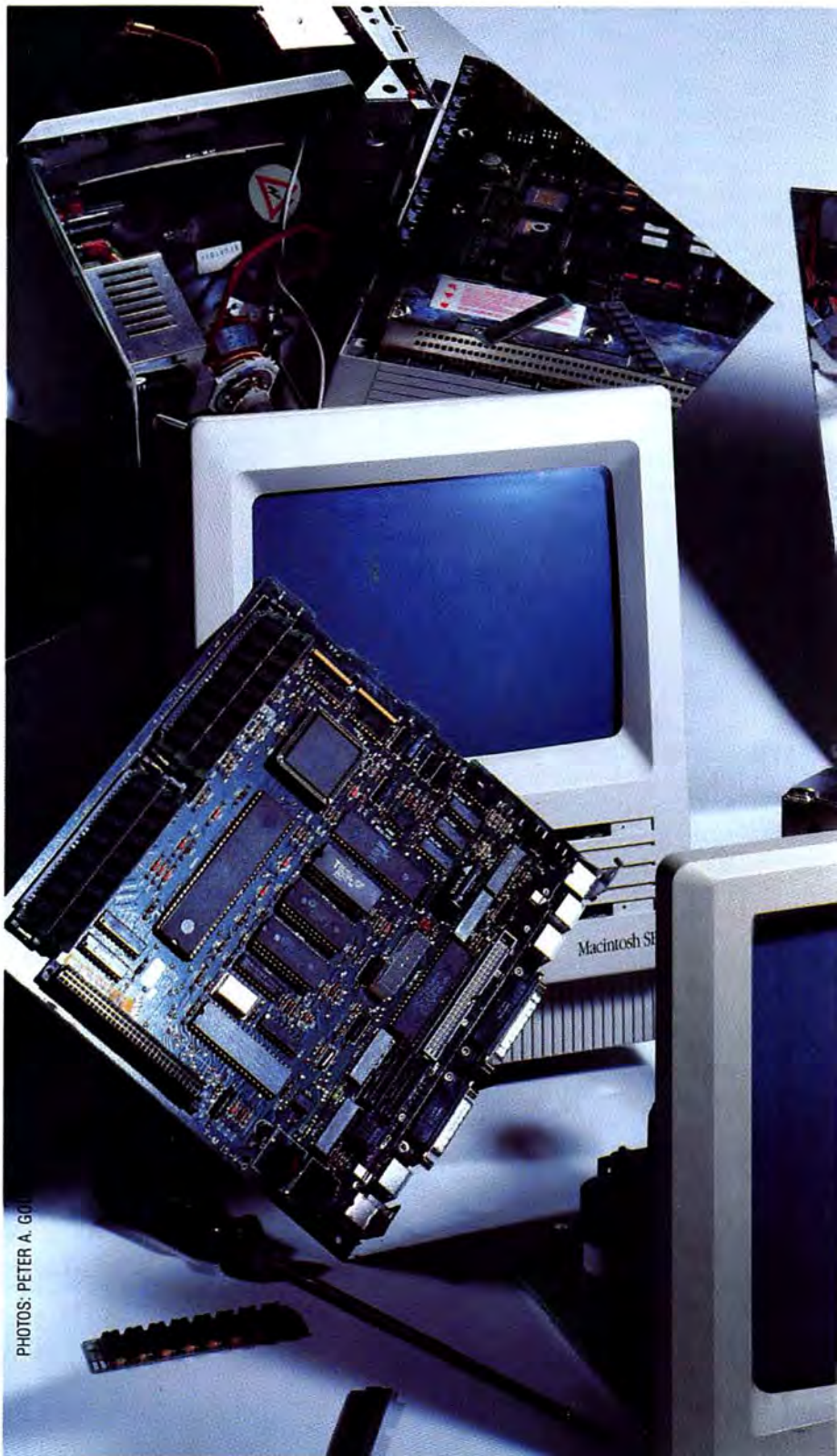
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The Persistence

Whatever you do, wherever you are, you'll never have enough RAM. Here's a guide to the paths you have available to you.



PHOTOS: PETER A. GO

If your idea of surrealism is trying to run FullWrite on a 1-megabyte Mac Plus, you're ready for a memory upgrade. How much you'll need depends on the kind of work you do, but regardless of your situation, one rule will definitely prove true: You'll never have enough. Given that fact, here's what you should know about memory and the upgrades available to you.

THINGS ARE WHAT THEY SIMM

In the Mac Plus and up, the Mac's temporary memory, or RAM (random access memory), resides in single in-line memory modules (SIMMs). They're installed on the Mac's motherboard, and since a standard 1-megabyte Mac always has four of them, they're pretty easy to spot. When you look at a SIMM, you'll see a narrow circuit board about 3 inches long with eight dynamic RAM (DRAM) chips on one side and a row of metal contacts along one of the long edges.

The DRAM chips can come in 256-kilobit or 1-megabit capacities, so, depending on the type of DRAM on the SIMM, the SIMM's total memory could be 256K or 1 megabyte. You can tell which you have, because the type

BY RUSSELL ITO

of Memory



will be embedded in the part number on the DRAM chips. If you see the number 256 somewhere in the part number, you've got a 256K SIMM. Unfortunately, things aren't so cut-and-dried for 1-megabyte SIMMs. If you check the part number and you see 1M, 1024, 1100, or anything similar — but not 256 — you're looking at a 1-megabyte SIMM. (Unless you buy your SIMMs from some guy in a bus station bathroom.)

However, not all SIMMs come with only eight DRAM chips. IBM-compatible SIMMs actually have nine. You can install these in a Mac, but you'll be paying for an extra chip that the Mac can't read, and frankly no one needs something that does nothing — especially at today's prices.

The contacts, or *fingers,* along the SIMM's edge look like little metal teeth, and the main thing you have to worry about is making sure they're pointing in the right direction when you install the SIMM. If you look into a SIMM socket, you'll see a row of springs sticking out along one edge. The SIMM's fingers must make contact with these springs, so, when you insert the SIMM, make sure you've got it turned the right way.

SLIM SIMM VERSUS THICK DIP

In addition to their memory capacities, SIMMs also come in two physical sizes: surface mount, or low profile; and dual in-line package (DIP), or high profile. Surface-mount SIMMs are generally more popular for the Plus and SE, because they take up less room inside the Mac. These SIMMs use DRAM chips that mount directly to the surface of the circuit board, which reduces their bulk. And since slim is in, surface mounts are the SIMMs everyone wants, but that also makes them more expensive. DIP SIMMs are cheaper, but because they use DRAM chips with leads that have to pass through the circuit board, they

also take up more room. You can install either type in any Mac, but DIP SIMMs may get in the way if you have a Mac Plus or SE with other internally installed hardware, such as accelerators or hard disks. Since the Mac II has lots of room, however, you can save some money by buying DIP SIMMs when upgrading it.

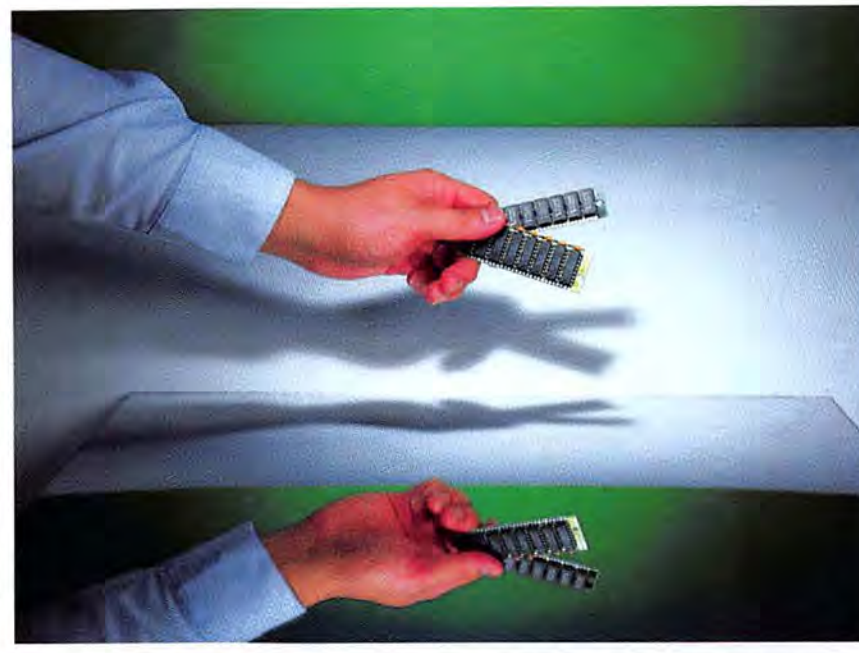
SOCKET TO SIMM

To this point, we've been talking about standard SIMMs, but there is another configuration available: socketed SIMMs. Several companies offer these 256K models, and they look and function just like regular SIMMs, except that there's a socket on the edge opposite the fingers. The idea is that you insert the socketed SIMMs into the Mac motherboard, then insert the Mac's SIMMs into the open sockets on the expansion SIMMs.

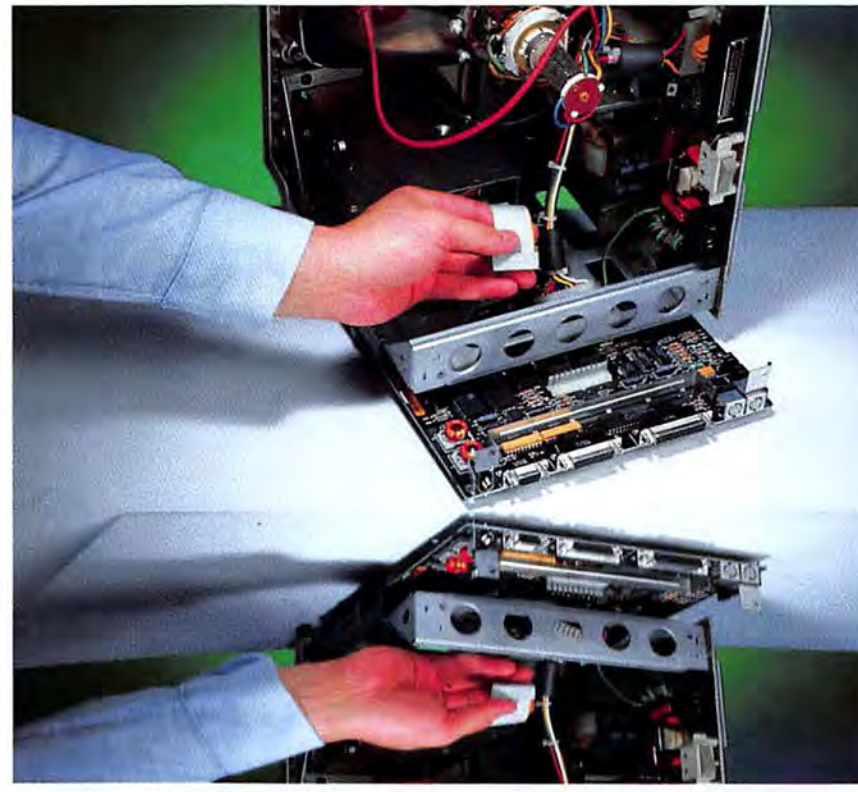
Since it uses the cheaper 256K SIMMs, this piggyback method is economical, but it does have some limitations. First, socketed SIMMs may come in surface-mount or DIP versions. Depending on how much stuff you've packed into your Mac, the DIP versions may not fit, so make sure you've got enough room before you buy. Second, some of these kits can't be expanded further, so even though you may have reached only half the computer's maximum RAM, you could be stuck. As always, it pays to plan ahead. Piggybacks can be an economical long-term solution, but they can just as easily turn into an expensive stopgap.

FASTER THAN SIMM

Just like hard disks, DRAM is rated for speed, although dealers will usually refer to the SIMM, rather than the RAM chips themselves, as being rated at a particular speed. RAM speed is listed in nanoseconds: The lower the number, the faster the SIMM, but the speed rating isn't necessarily an absolute value. A SIMM's actual speed is usually faster than the stated number — what the number tells you is that the SIMM you're buying will be no slower than the reported value. For example, a 120-nanosecond SIMM may actually be running at 100 nanosec-



SIMMs come in two types: surface mount (low profile), and DIP (high profile). Either type can be installed in any Mac, but DIP SIMMs may not fit in a loaded Mac Plus or SE.



To open a Mac Plus or SE, you'll need a Torx wrench (available at most computer stores). Before cracking the case, make sure you've removed the programmer's switch. Once the case is off, disconnect the ribbon cable (or cables, depending your configuration) and the white multiple-wire connector from the motherboard. On the SE, carefully disconnect the speaker wire, which is right next to the white connector. You should now be able to slide the motherboard out. (Be patient; it may not slide out smoothly.) Remember: DON'T TOUCH THE VIDEO TUBE OR CIRCUITRY.



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The SIMMs in a Mac Plus are arranged in a vertical array of two pairs of two slots each, limiting the memory expansion to a maximum of 4 megabytes. Each of these pairs is called a row.

onds — or even faster. The Mac Plus and SE both require 150-nanosecond (or faster) SIMMs, while the Mac II requires 120-nanosecond (or faster) SIMMs.

THE PLUS PLUS

The SIMMs in a Mac Plus are arranged in a vertical array of two pairs of two slots each, limiting the memory expansion to a maximum of 4 megabytes. Each of these pairs is called a *row,* and there are a few rules that govern them:

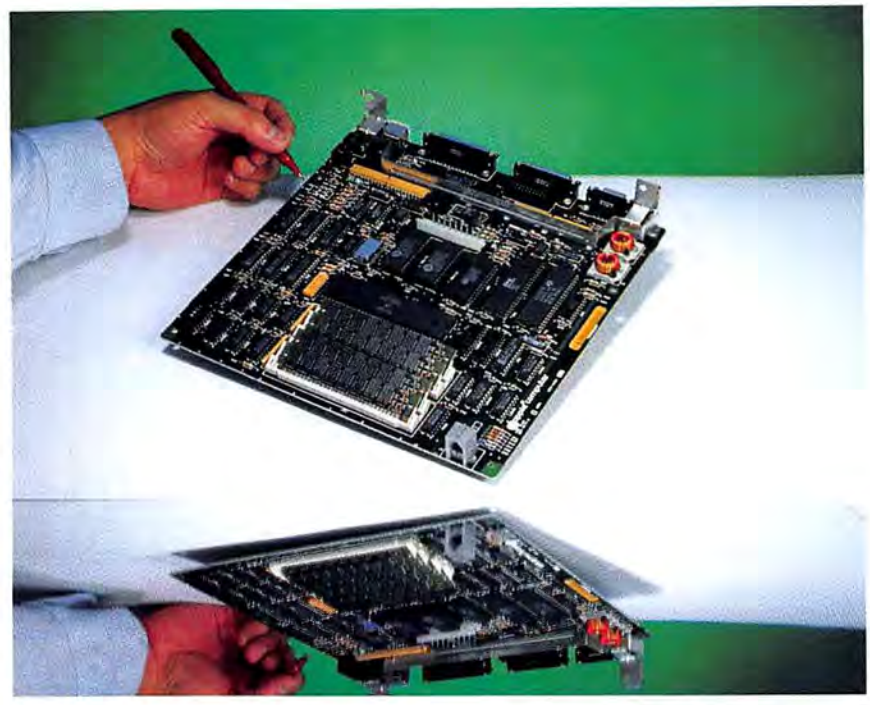
(1) All the SIMMs in a row must be of the same speed. You can, however, have differing speeds between the rows.

(2) All the SIMMs in a row must be of the same size. You can't mix a 1-megabyte SIMM with a 256K SIMM within a row.

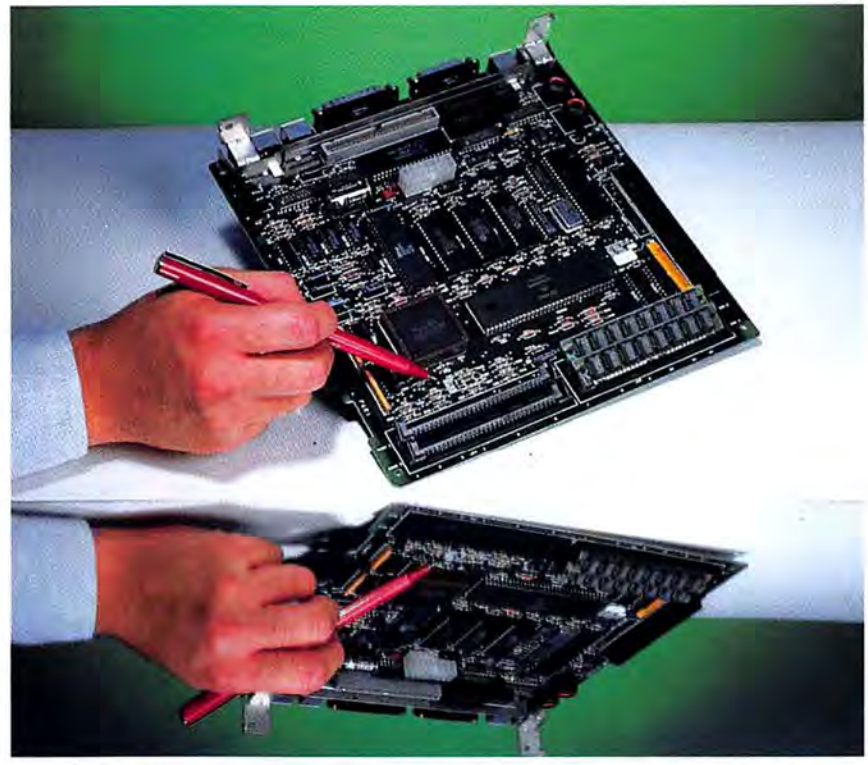
(3) A row must be completely filled or empty — it can't contain only one SIMM.

(4) Larger SIMMs must be installed in the first row, so if you're going to mix 256K and 1-megabyte SIMMs, make sure the 1-megabyte units are in the first row.

Because rules 2 and 3 impose specific restrictions, the upgrade path for a Mac Plus is as follows: 1 megabyte (the standard configuration is four



The Mac Plus's SIMMs are arranged in a vertical bank. The SIMM at the top is number 1. The resistor that you'll have to position is indicated. You can mix 256K and 1-megabyte SIMMs, provided you do so by rows. This is a 1-megabyte configuration.



The Mac SE's SIMMs are installed in two horizontal banks, each with two rows. SIMM 1 is in the top-left socket; SIMM 2 is in the upper right; SIMM 3 is in the lower left; SIMM 4 is in the lower right. The resistor is directly above SIMM 1. This motherboard is configured for 1 megabyte.



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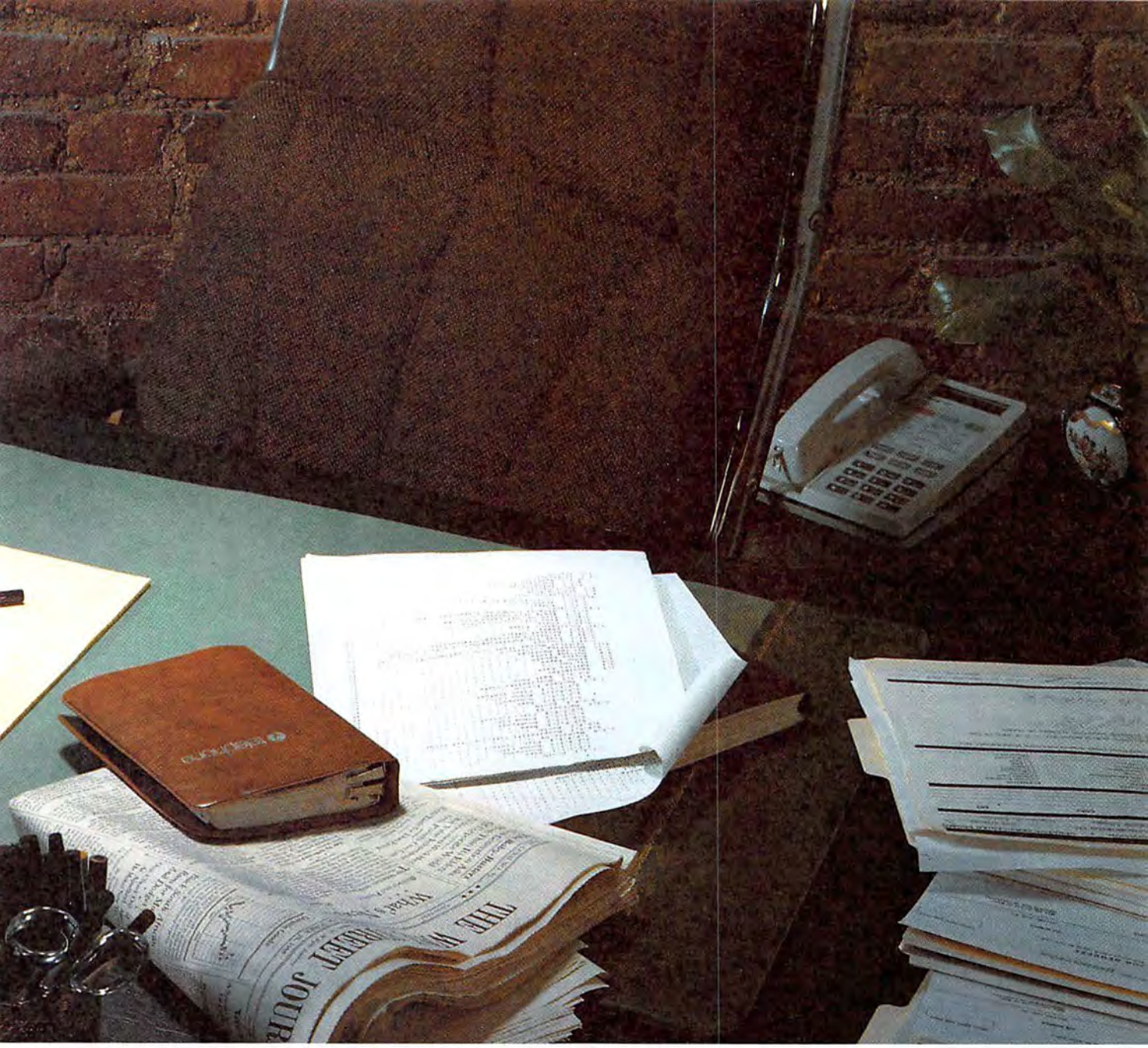


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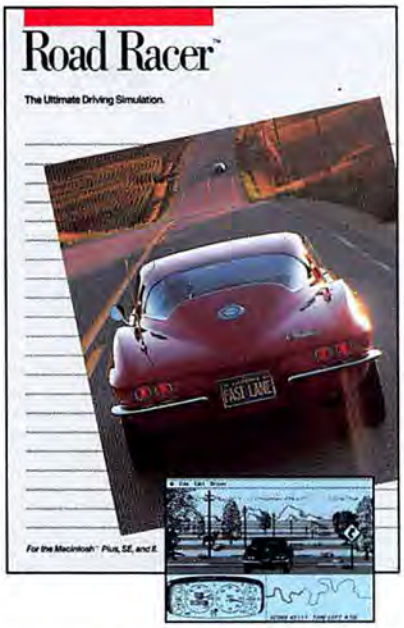
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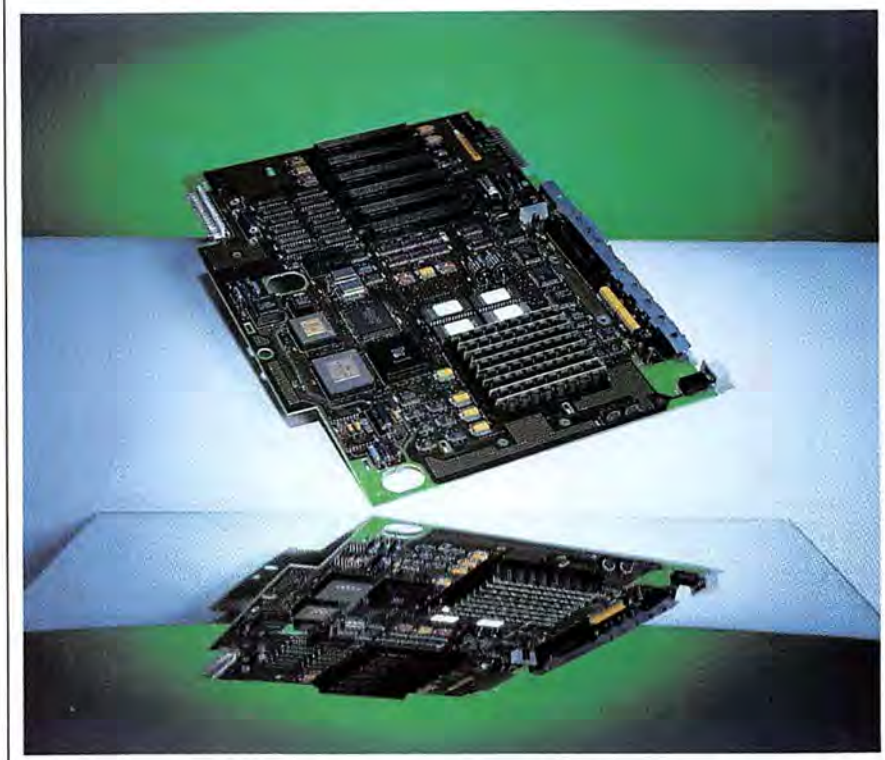
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The Mac II's memory is arranged in two banks of four SIMMs each. The SIMMs are numbered in pairs, 1 through 4. This is a 2-megabyte configuration, using eight 256K SIMMs.

256K SIMMs), 2 megabytes (two 1-megabyte SIMMs), 2.5 megabytes (two 1-megabyte SIMMs and two 256K SIMMs), and 4 megabytes (four 1-megabyte SIMMs). You can't have a 3-megabyte machine. The only trick in installing SIMMs, assuming you follow the rules, is getting the Plus to recognize how much memory it has available. To do this, look at the resistor on the logic board in the area labeled RAM SIZE. For a 2-megabyte machine, using two 1-megabyte SIMMs, the resistor (150 ohms) that's normally installed at R8 (labeled 256K BIT) must be moved to the socket marked R9 (labeled ONE ROW). For a 2.5- or 4-megabyte Mac Plus, it should be removed.

THE SE PLUS

The upgrade path for an SE is identical to that for a Plus, and in fact, the SE even follows the same rules governing SIMM types, position within a row, and so on. Like the Plus, the SE's memory banks are arranged in two sets of two rows. But, unlike the Plus, the SE's rows are arranged and read horizontally. As with the Plus, the resistor must be properly positioned for the Mac to know how much RAM it actually has. In the SE's case, the pertinent resistor is located at R35 (256K BIT). For a 2-megabyte SE, the resistor (150 ohms) should be moved from R35 to R36 (ONE ROW). For 2.5- and 4-megabyte SEs, it should be removed entirely.

THE MAC II EIGHT

While the Mac II has twice the memory capacity of either the Plus or SE, some of the same types of rules governing memory management apply. In the Mac II, SIMMs are installed in two banks of four (Banks A and B), instead of in rows of two. But interestingly enough, the SIMMs are numbered in pairs, so while you may have eight SIMMs installed, the Mac reads them as SIMMs 1 to 4. Not only that, SIMM 1 is actually in Bank B (don't ask; I don't know why). As with the Plus's and SE's rows, you can't mix SIMM types within a bank. Doing so will cause the bank to default to the lowest capacity SIMM, so don't shuf-

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fle them before installation.

Because the banks must either be full or empty, your choice of configurations is this: 1 megabyte (again, the standard configuration is four 256K SIMMs), 2 megabytes (eight 256K SIMMs), 4 megabytes (four 1-megabyte SIMMs), 5 megabytes (four 1-megabyte and four 256K SIMMs), or 8 megabytes (eight 1-megabyte SIMMs). Because of the Mac II's rule of fours, you should give a lot of thought to how you want to upgrade your system before you do it. For example, 2 megabytes may sound like all you'll ever need. But if you choose this route and subsequently decide to upgrade further, you'll have to sell or trash the four additional 256K SIMMs you installed for the upgrade. The same holds true for the 4-megabyte model; except in this case, you'd actually be pulling the SIMMs that came installed in the Mac II. For these reasons, the conventional upgrade path for a Mac II is 1, 2, 5, and 8 megabytes — and in fact, most users skip right to 5 megabytes, if they can. Unlike the Plus and SE, the Mac II is a plug-and-go machine — you don't have to make any resistor changes.

MEMORY LANE

So now that you know what you *can* do, here are some things you *should* do. Before you touch a SIMM, make sure you've discharged any static you might have built up from walking across the carpet or rubbing your acrylic sweater with a balloon. All it takes is one spark, and your precious treasure will be turned into the computer equivalent of a pet rock. And when you're working on a Plus or SE, make absolutely sure you don't touch the video tube or circuitry. Even if you've got the machine unplugged — which you definitely should — these goodies can retain enough voltage to turn *you* into the equivalent of a pet rock. So be careful, and the only melting circuit boards you'll see will be in your dreams.

RUSSELL ITO BOUGHT HIS MAC AS A 512K, UPGRADED IT TO A PLUS, AND AROUND THE TURN OF THE CENTURY SHOULD HAVE ENOUGH SAVED TO BUY A COUPLE OF SIMMS.



When installing a SIMM, make sure the metal fingers are facing down and that you've got the SIMM positioned so that the fingers are in contact with the little springs in the SIMM socket. Insert the SIMM vertically; then push it back until it snaps into place. Make sure you don't touch the SIMM's metal fingers — a layer of finger oil can cause oxidation and prevent good contact.



To remove a SIMM, take out the most exposed SIMM first (this will either be the first or the last in the bank). Push the end clips away from the SIMM and simultaneously push the SIMM out. It will flop over, loose, and you can remove it. If you're worried about breaking the little hooked clips that face the SIMM, don't be. Chances are that you will eventually break these, but this won't have any effect on the SIMM's ability to function.

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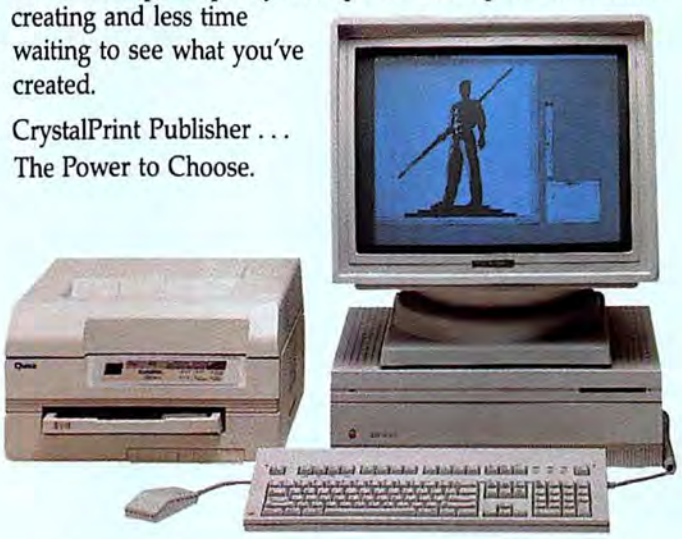
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Pop Quiz.

Stop. This is a test. For the next 60 seconds, we will be conducting a quiz about Macintosh® II Videographics. Do not turn the page until you have looked at the visual clue and answered all the questions.

Which Macintosh II graphics card offers the widest range of capture and display resolutions–NTSC, PAL, Apple® Monitor, hi-res, interlaced, non-interlaced and other modes?

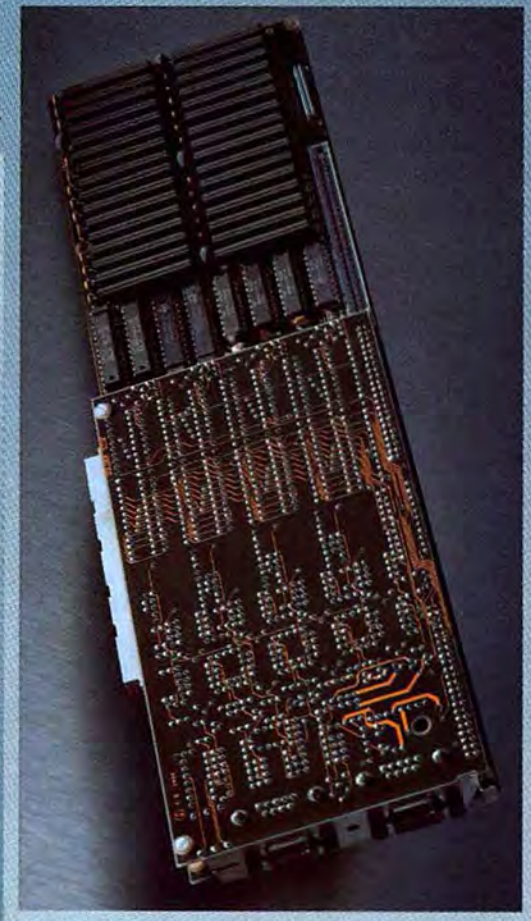
a) NuVista 2M b) NuVista 4M c) All of the above

Name the only videographics card which provides true-color, real-time capture *and* broadcast-quality display while occupying only a single slot in a Macintosh II.

a) NuVista 2M b) NuVista 4M c) All of the above

Which videographics card offers full QuickDraw™ compatibility at 1,2,4,8,16 or 32-bits per pixel?

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Visual clue for Videographics test.

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Getting Wired

Cables are unexciting and unsung. But for those times when your life, job, or sanity hangs on a few strands of copper, here's what you should know.

In nature, knowing the subtle distinctions of the markings of snakes can mean the difference between life and death — the same principle applies to your computer's cables. Equipment cables are neither as innocent nor as standard as they appear. For them, the paradox "same but different" actually applies. Two cables that look the same don't necessarily do the same things. Under the circumstances, the best course is to be completely paranoid.

When buying from a mail-order house, be *certain* and *specific* about your needs. If your purchase includes a cable, find out which Macintoshes the cable will fit. With computer cables, as with snakes, a little prior knowledge can be a lifesaver.



ALAN COBER

BY SALVATORE PARASCANDOLO

CABLE CONSCIOUSNESS

Typical cables have from 2 to 50 small wires running through them, and each wire can carry electrical *power,* data pulses called *signals,* or nothing. Many times, only a few of the cable's available wires are actually used. Devices, such as your computer or printer have *ports* to which various cables connect. The size and shape of a port and how signals flow in and out determine the kind of cable you'll need. If the business end of a port or cable connector shows rows of holes, or *sockets,* it's a female. If it has rows of pins, it's a male. Each pin or socket of a cable connector is labeled with a number that usually appears on the plastic wall in which it's embedded. When discussing what's connected to what, we call connector positions *pins* regardless of whether they're male or female.

Equipment cables aren't usually wired so that a given pin at one end is connected to the corresponding pin at the other end. Connector shapes or genders can also be deceiving. Some cables can fit in totally inappropriate ports. Without a testing device and wiring charts, you'd never know what goes where, or whether it was right or not. If you intend to build, adapt, or test cables yourself, it's imperative to have *pin-out charts,* which describe which wire carries which message.

GAIN THROUGH CABLE

The prime concern, and mandatory final check when making cables, is to ensure that the two ends of a cable are connected like the book says. To save yourself countless hours of frustration, invest the time to check several times every step and every bit of information you read. Even then, question your own assuredness. For some hookups, this pin-out research will take longer than the actual construction.

Equipment usually comes with pin-out charts. If you can, compare the charts that come with any two devices that you wish to connect. Get supporting information from several sources like connectivity literature (see the sidebar "Parts and Charts") and manufacturers. Some diagrams may refer to the same signal name differently and may even depict subtly different pin connections — some of which may be harmless, or functionally identical, and some of which may be outdated or simply wrong.

Be especially careful of how you identify a connector's or port's pins. Referring to the charts in this article, you'll notice that the male and female versions have their pins numbered in reverse order. Looking square into the face of a male connector, the upper left pin is number 1. On the female connector, that's pin 13. When wiring, go strictly by pin numbers, and not by relative location. Some wiring diagrams show the connections viewed from the *back* of the connector, which can easily confuse you into a backward hookup. Luckily, most crossed-signal errors for printers and modems aren't harmful

Adopting Adept Adapters

You can use these lifesavers to change the gender of a connector, convert 25-pin to 9-pin interfaces, or reroute the signals to a different pin layout. If you do a lot of traveling, you should keep several with you. A well-stocked arsenal should include: a DB-9 to mini DIN-8 for adapting your Mac Plus, SE, or II to cables for equipment originally designed for the Mac 128, 512K, and 512KE; a DB-9 to DB-25 modem cable for Hayes and compatibles; a Mac to DB-25 serial printer cable, which can also serve as a communications link between a Mac and PC-type computer; and, finally, a DB-25 gender changer for the odd modem or printer that's got matching pin-outs but the wrong gender.

There's even a serial cable that can adjust itself for the job. It's called the SmartCable, and it's made by IQ Technologies. You can use it with a printer, modem, computer link, and equipment with various pin-outs; and it will configure itself electronically. But for most non–Apple-compatible printers, a cable alone is not enough. You'll also need the appropriate printer driver. You may be able to get the driver you need from the printer manufacturer, but if not, SoftStyle sells a variety of drivers, including those for Epson, Toshiba, IBM, HP LaserJet, and some popular daisywheel printers.

Parts and Charts

You can find cables and cable components by reading the ads from mail-order houses and specialized suppliers throughout *MacUser.* You should also have pretty good luck at any local computer dealer that carries a variety of hardware. They usually have ready-made cables for most standard needs. Some common and even rare tools, parts, and cables can be found at your local Radio Shack or an electronics hobby shop.

IQ Technologies
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Reference books:

American National Standard X3.131-1986 (defines the SCSI interface).
Apple Computer, Inc. *Macintosh Family Hardware Reference.* New York: Addison-Wesley, 1988; $26.95.
Apple Computer, Inc. Technical manuals for the ImageWriter, ImageWriter II, LaserWriter Plus, IINT, and IINTX.
Bove, Tony and Cheryl Rhodes. *The Well-Connected Macintosh.* New York: Harcourt Brace Jovanovich, 1987; $11.95.

Some wiring diagrams show the connections viewed from the *back* of the connector and can easily confuse you into a backward hookup.

(although shorting power to ground can be damaging).

SHE WORE A RIBBON CABLE

A ribbon cable has its wires arranged side-by-side, like lanes on a highway. It's great for tool-free construction, because it needs no solder. Instead, you use special connectors that press on, cutting through the insulation, and remain solidly and reliably mounted. The ribbon can be flexed and routed easily, unlike some conventional cable that can be as flexible as an aqueduct. Connections can even be undone and rearranged with your bare hands, although occasionally you'll also need a common tool, like a vise.

Because of its relative position in the ribbon, a wire is easy to trace. But be careful: Ribbon cable wires are not sequentially numbered. Instead, the wires are interleaved horizontally, just like a connector's. For example, on a 25-conductor cable, the wires read like this: 1, 14, 2, 15, 3, 16, 4, 17, and so on until 13, 25. With reasonable care, ribbon cable connectors will automatically align their pins with their corresponding wires. Just make sure that the ribbon end is trimmed square, enters at a right angle, and is not scrunched to one side of the insertion slot.

Pressing 25 or 36 or 50 wires in place requires considerable force. The best method is to squeeze the connector in a vise. If you haven't got a vise, you can lay a wood block or a book on the assembly and use a second block or book to tap the unit together.

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Please circle 73 on reader service card.

You can put any number of connectors anywhere along a length of ribbon cable, as long as there's space. You can even move or remove a connector with no ill effects. This enables you to make gender changers, extenders, splicers, adapters with different ends, Y-adapters for hooking up multiple devices to one Mac, or one cable that fits several devices, each with a different connector, pin-out, or gender.

Unfortunately, ribbon cable isn't shielded. That's of little consequence for serial connections to modems and printers, but an external SCSI ribbon cable might produce significant noise in computer peripherals or in household radio and TV receivers — *and not necessarily in your own house.* Slip-on shields are available, but you can make one for a lot less by simply wrapping the cable in aluminum foil and connecting it with a short wire to any cable connector screw hole on the Mac.

For special hook-ups, or if you have 25-wire ribbon cable and plan to use 9-pin connectors, you can cleanly strip away the unneeded wires. Special connectors can also accept the inner wires of flat telephone cable, which is cheap, reliable, and compact. Long cables for modems and printers, extensions, or adapters can be made this way. True, some of the homemade jobs look messy, but I've used such cables and adapters for several years without a problem.

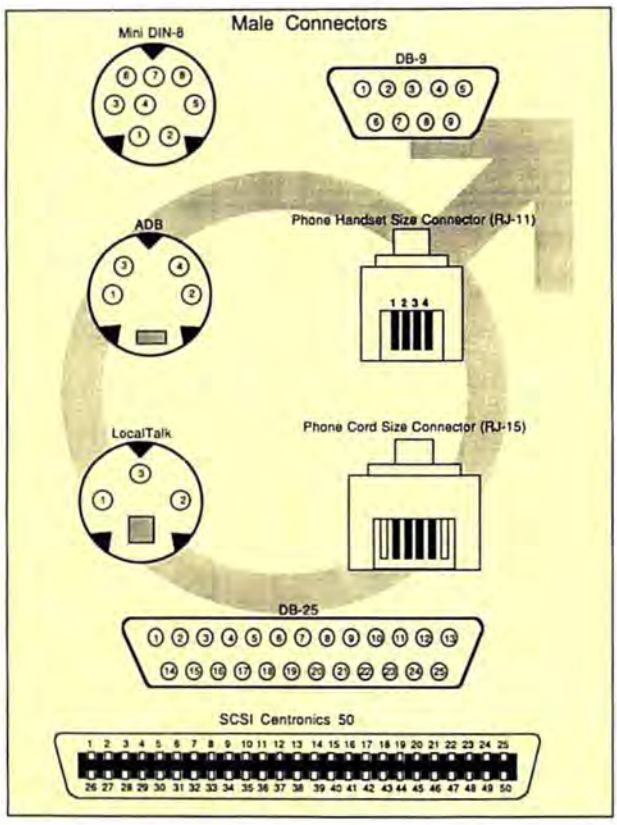
Ribbon cable is great for tool-free construction, because it needs no solder.

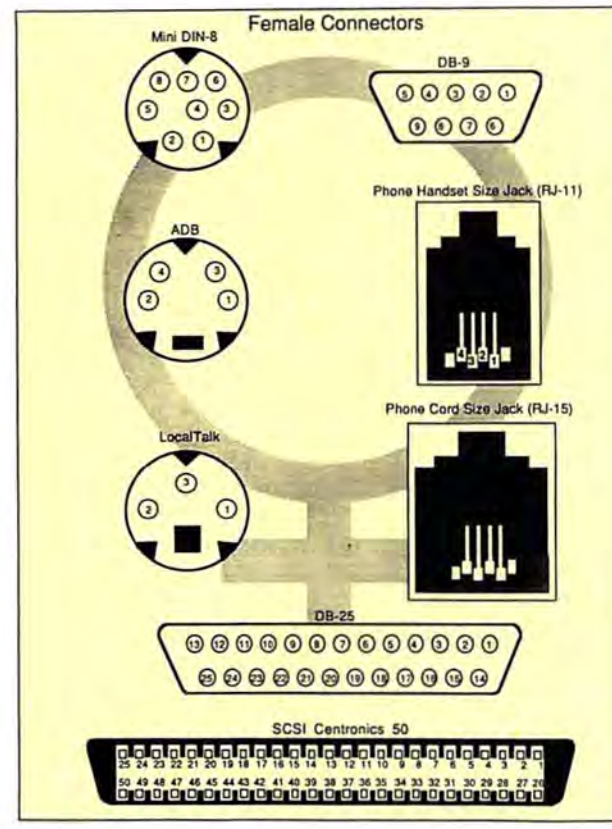
WIRED ON HEAVY METAL

For soldered cables, you'll need connectors of the proper shape and gender, cable with at least as many wires as your equipment demands, rosin core electronic solder, and a set of connector *shells* (or substitutes) for enclosing your handiwork at each end.

In addition, you'll also need needle-nose pliers, one or more needles, pins, or thin, stiff wire to reach the inside sockets of female connectors for continuity tests, a low-wattage pencil-tipped soldering iron, or gun, desoldering braid, and a holding tool like a vise, locking pliers, a clamp, a clip, or even adhesive tape.

You can check a connection in one of four basic ways: by actually using the finished cable; by using an ohmmeter, which measures resistance between two points (zero resistance is a good connection); by using an inexpensive light-the-bulb tester; or by using a 9-volt battery, some wire, and your





A head-on view of male and female connectors.

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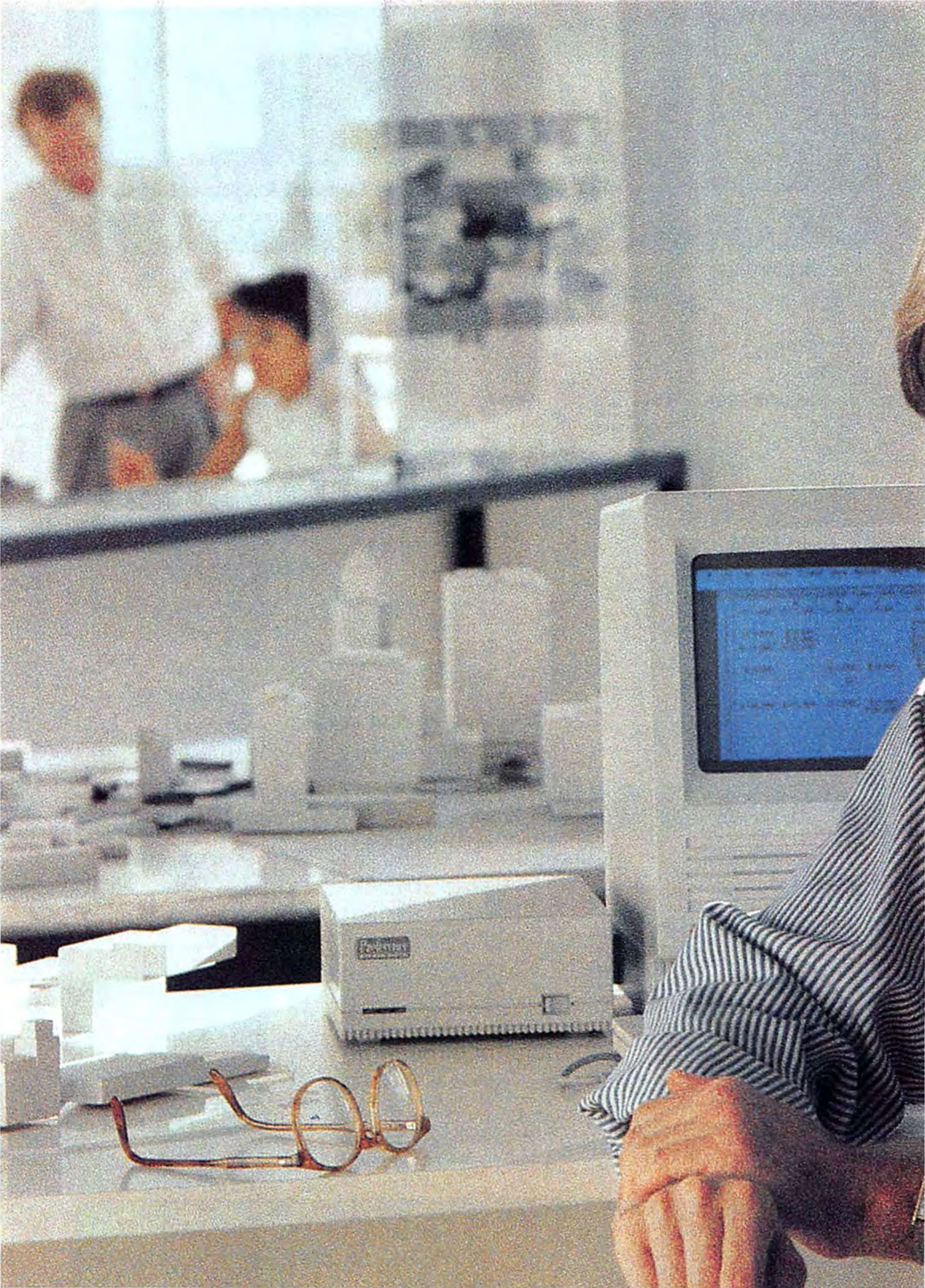
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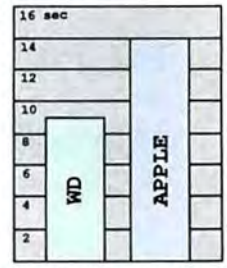
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Mac 512 Pin-to-Pin Reference Chart

Male DB-9

Device	Cable end	Mac-side pins to device-side pins							Special notes	Apple cable no.
ImageWriter	male DB-25	1,1	3,7	5,3	7,20	9,2			on DB-9 connect 3,8	590-0169
ImageWriter LQ	male mini DIN-8	3,4	4,8	5,5	6,2	7,1	8,6	9,3		590-0332
LaserWriter Plus	male DB-9 LocalTalk or PhoneNET-type adapter on both ends									
LaserWriter I	male DB-9 LocalTalk or PhoneNET-type adapter on Mac/Male mini DIN-8 Appletalk or PhoneNET-type adapter on printer									
Apple Personal Modem	male mini DIN-8	3,4	4,8	5,5	6,2	7,1	8,6	9,3		590-0332
Hayes Smartmodem	male DB-25	1,1	3,7	5,2	7,5	9,3	6,20		on DB-9 connect 3,8	
Mac 512	male DB-9	1,1	3,3	5,9	9,5					
Mac Plus/SE/II	male mini DIN-8	3,4	5,5	9,3					on DB-9 connect 1,3	
IBM PC–type serial port	female DB-25	1,7	5,3	6,5	7,20	9,2			on DB-9 connect 1,3,4/on DB-25 connect 6,8,20	
IBM PC/AT or PS/2 serial port	female DB-9	1,5	5,2	6,8	7,4	9,3			on Mac DB-9 connect 1,3,4/on PS/2 DB-9 connect 1,4,6	

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This is the value you've been demanding. Actual size 72 dpi, with a palette of 16.7 million brilliant colors on a Sony Trinitron modified to E-Machines' exacting specs.

You can put a little color in the cheeks of your company president next time you produce the newsletter. Or use color to distinguish multiple layers and objects in CAD drawings. Or create charts to transform complex numbers into easily understood color graphs.

Whatever you do on your Macintosh, you'll do it more productively with a T16.

Mac Plus/SE/II Pin-to-Pin Reference Chart

Male mini DIN-8

Device	Cable end	Mac-side pins to device-side pins							Special notes	Apple cable no.
ImageWriter	male DB-25	2	3,3	4,7	5,2	8,7			on Mini DIN-8 connect 4,8/on DB-25 connect 2,20	
ImageWriter LQ	male mini DIN-8	1,2	2,1	3,5	4,4	5,3	6,8	8,6		590-0340
LaserWriter Plus	male mini DIN-8 LocalTalk or PhoneNET-type adapter on Mac/Male DB-9 LocalTalk or PhoneNET-type adapter on printer									
LaserWriter II	male mini DIN-8 LocalTalk or PhoneNET-type adapter on both ends									
Apple Personal Modem	male mini DIN-8	1,2	2,1	3,5	4,4	5,3	6,8	8,6		590-0340
Hayes Smartmodem	male DB-25	1,4	2,5	4,7	3,2	4,1	5,3		on mini DIN-8 connect 8,4	
Mac Plus/SE/II	male mini DIN-8	3,5	4,4	5,3						
IBM PC–type serial port	female DB-25	1,5	2,6	3,3	4,7	5,2			on DB-25 connect 6,8,20	
IBM PC/AT or PS/2 serial port	female DB-9	1,8	2,4	3,2	4,5	5,3			on mini DIN-8 connect 4,8	

Adapter cable	Cable ends	Mini DIN-8 pins to DB-9 pins								
Mini DIN-8 to DB-9	male DIN-8, female DB-9	1,6	2,7	3,5	4,3	5,9	6,4	8,8	on DB-9 connect 1,3	590-0341

report, here's a condensed version.

As with other E-Machines models, the T19 screen image is very sharp and has excellent color quality and gray purity. Image quality is comparable to the T16, and for those who want a larger screen, the T19 is the way to go. E-Machines has once again produced a winner in the color monitor market.

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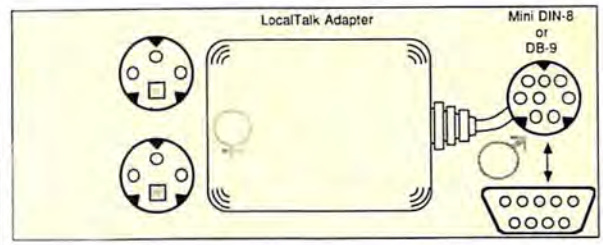


Figure 1: This Apple LocalTalk adapter connects Macs to a network using the Apple standard round cables. It's available with Mini DIN-8 or DB-9 Mac-side connectors.

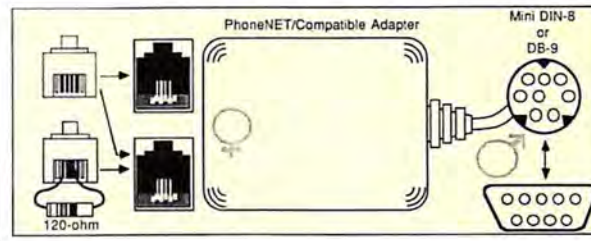


Figure 2: This Farallon PhoneNET adapter (or a compatible one) can connect a Mac to a network whose main signal carrier is ordinary telephone wire. A Mac at the end of a line should have the 120-ohm resistor device in its unused receptacle.

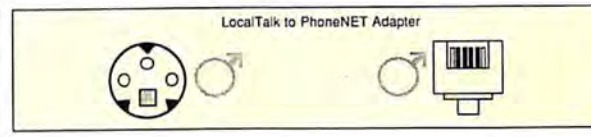


Figure 3: The LocalTalk to PhoneNET adapter is used as a bridge between a LocalTalk adapter and a PhoneNET adapter on the same network.

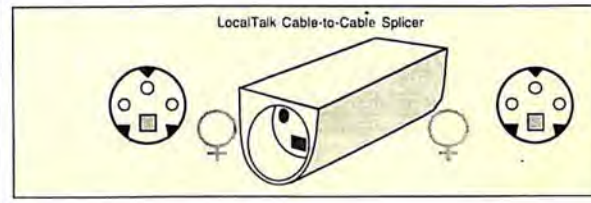


Figure 4: The LocalTalk Cable-to-Cable Splicer is used to extend LocalTalk cable connections.

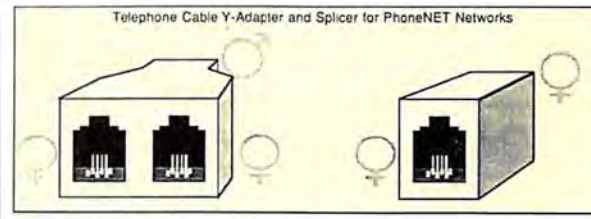


Figure 5: You can use these telephone cable Y-adapters and splicers to extend PhoneNET cable connections. They're inherently yank-proof. The Y-adapter can be used to add equipment to the network.

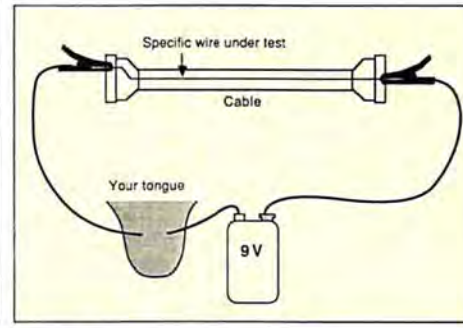


Figure 6: When you don't have a specialized continuity tester, you can always resort to the tongue test. If the connection is good, you should get a metallic taste and a slight zing. But take care — fresh 9-volters do pack a bit of a kick. You can use a 1.5- volt battery if you're sensitive enough.

tongue. The latter method is illustrated in Figure 6.

Strip about 1/4 inch of insulation off each wire and lightly coat the exposed ends with solder. Also apply solder to troughs on the wire side of the connector's pins. For each connection, heat the pin and simultaneously insert its wire into the trough, then let the connection cool. Don't be generous with the solder, or you'll inadvertently bridge some pins, which might corrupt the connection and turn your equipment into a toaster oven.

If you don't have a shell for your connectors, you can fabricate your own by encasing the wired pins with silicone rubber or five-minute epoxy. Before you start sliming, though, protect the business end of the connector by wrapping it with tape. The finished product is rather permanent, so before you encase everything in epoxy, make dead sure that your cable works.

WIRE YOU HERE

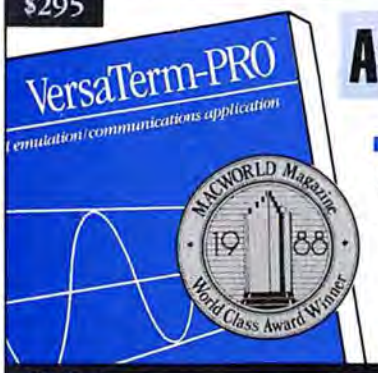
If you can't get the proper connectors, you can make a special cable from a suitable spare by rearranging its connections — not at the ends, but in the middle. Just cut into the outer sheath to expose all the available wires, and reconnect them as needed — either by soldering or twisting. You can even combine two cables, each with a valuable end, into an electronic lifeline. Even if a cable's connectors are molded on, you can map the pin-to-wire connections with a continuity checker.

PULLING THE PLUG

With new devices introduced so frequently, the world of cables remains a snake pit. Monitor cables seem to be the worst at consistency of pin-outs and connector types, and nearly require a dedicated book. The basic checking and construction tips in this article apply to just about any cable. We do apologize that the pin-outs for connecting a 12-cup Mr. Coffee to a LaserWriter NTX just didn't reach us in time.

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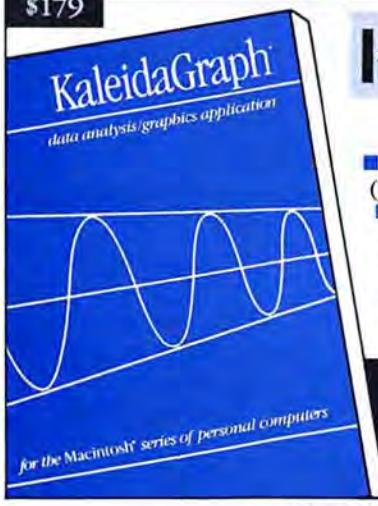


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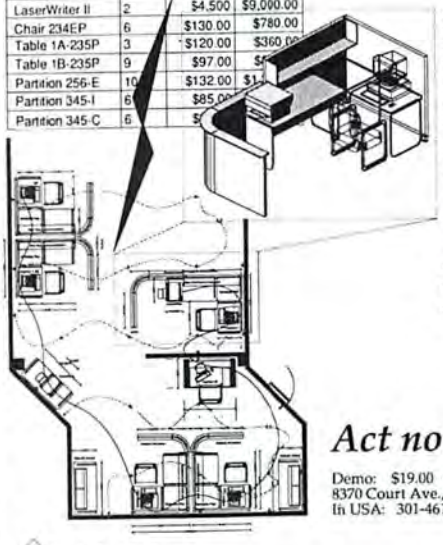
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Calendar Maker	$24
Copy II Mac	18
Disk Express	28
Diskfit	47
Disktop	24
Findswell	30
Icon-It!	38
Multi-User	
Super Laser Spool	186
My Disk Labeler w/Color	32
PowerStation	28
QuicKeys	47
Sentinel	139
Sidekick	57
Stepping Out II	49
Suitcase	37
Super Laser Spool	71
SuperSpool	46
Tempo II	71

UTILITIES & HYPERCARD STACKWARE

Bulkmailer	$70
Bulkmailer Plus	165
Business Class	26
City to City	26
Disk Finder	32
Diskquick	25
Fastback Mac	47
Forset Bus. Forms Edit. 1	45
HFS Navigator	32
Hyperbook Maker	30
Hyper DA	33
Hyper Tutor	24
Laserspeed	52
Macinuse	37
Macsafe	70
My Disk Labeler w/color	32
The Nightwatch	79
Prototyper	59
Read-it	185
Report!	52
Shanghai	21
Smooth Talker	29
Video Works Hyper Card Driver	54
Video Works II Accelerator	106

WORD PROCESSING

Mindwrite	$91
Mindwrite Express	117

WORD PROCESSORS

FullWrite Professional	$235
MS Write	77
MS Word	219
Word Perfect	179
Write Now	93

GAMES

Balance of Power	$27
Beyond Dark Castle	24
Chessmaster 2000	26
Dark Castle	24
Déjà Vu	26
Early Games	25
Falcon	29
Ferrari Grand Prix	29
MS Flight Simulator	28
Patton vs Rommel	23
Shadowgate	28

FONTS

Fluent Fonts	$23
Fluent Laser Fonts	43
Fontshare	138
Orchestra of Fonts, Vol. 4	23

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68030 for the Mac II & the Mac IIx

Over twice as fast

MACWORLD EXPOSITION
BOOTH #69

Step a Generation Ahead

Powerful new Macintosh™ software needs a new generation of hardware. Advanced graphics and engineering software now has the potential to make your Mac II or Mac IIx perform like a high-end workstation costing $25,000 or more. But software alone won't get you the workstation you need — the DayStar™ 33/030 Accelerator II™ will upgrade your Mac II/IIx hardware into a powerhouse workstation, and at a fraction of the cost.

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Complex illustrating, drawing and CAD layout is no longer a drag, click and wait. With the DayStar 33/030 Accelerator II you can increase your Mac II/IIx speed from 16 MHz to a blazing fast 33 MHz.

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Plug In and Take Off

Installation is easy, just like installing SIMMs. Simply unplug the 68020 processor and plug the 33/030 Accelerator II right in. Don't change your SIMMs because the 33/030 runs at full speed with the memory that you have. It's fully compatible with all standard Mac II/IIx software, including A/UX™.

Now shipping! Call our toll-free hotline today to receive the name of the nearest DayStar dealer.

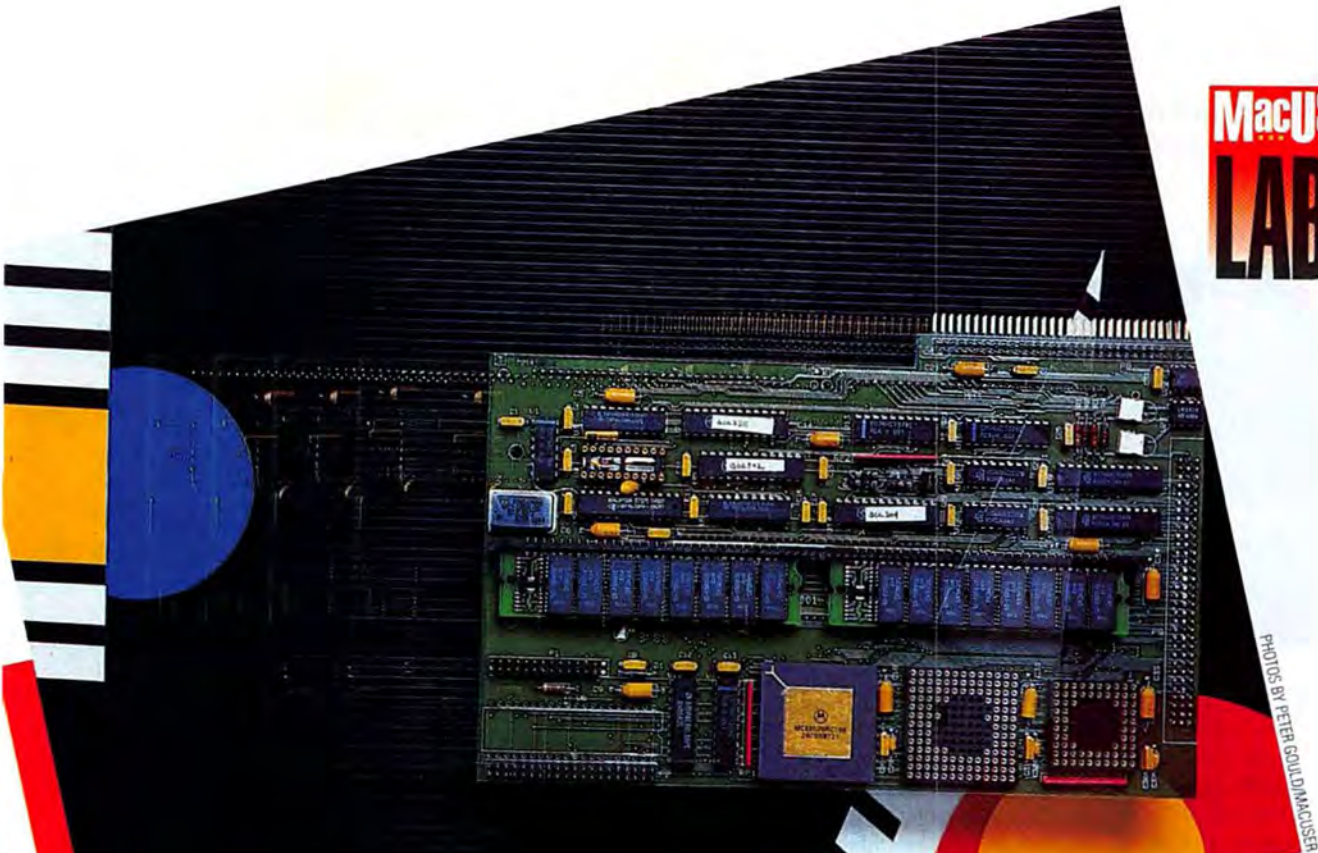
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Maximum G-Force

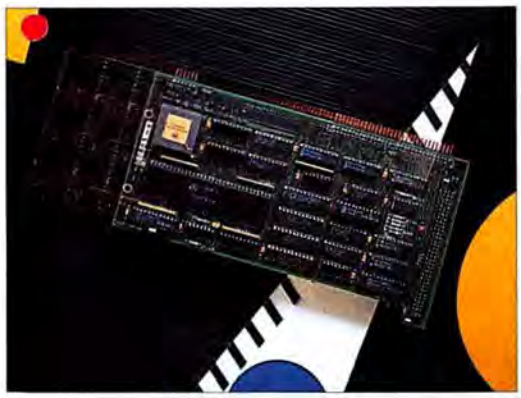
Accelerators can speed up your spreadsheets, databases, and graphics and, in the process, give you some of the power of the Mac II and IIx.

By Gil Davis and the MacUser Labs Staff

To have and have not. Since the introduction of the Mac II, that about sums it up for those on either level in the hierarchy of Macs. By any calculation, speed envy is on the rise. One coworker is reluctant even to look at your spiffy new database (cooked up on your Mac II) on his Plus or SE. Another has given up the mathematician in her soul because she can't bear to wait while the numbers recalculate. Derogatory phrases like "toaster with a window" can be heard in the corner cubicles where the Pluses and SEs reside, while those with the sickness can be observed walking around the office with a shuffling gait, as if wearing slippers. No question, the envious ones are a sullen breed: round-shouldered, spiteful, given to excluding Mac II owners from luncheons, as if by instinct. Mac II owners have become pariahs of the portable-Macintosh society.

Fortunately, there's a remedy for all this: the accelerator. The mere word suggests strange, kinetic, almost curative powers. With accelerators installed in

Maximum G-Force



DoubleTime-16

Requires: Mac SE. Pros: Requires no additional memory. Allows full compatibility with all applications that don't work with the 68020. Cons: At press time, the board did not support use of the 68881 floating-point unit.

AOX, Inc.
486 Totten Pond Road, Waltham, MA 02154
(617) 890-4402
$395

a few of the SEs around the office, the lame walk upright and swiftly; artists appear in our midst; databases and spreadsheets flourish; and Mac IIs can be overtaken. In short, the accelerator board is good for morale, for health, not to mention productivity.

All joking aside, the facts as they've come in are pretty clear: Accelerators can speed up operations in spreadsheets, graphics programs, and some databases in significant ways. But in what ways and with what boards? Here at MacUser Labs we decided to find out.

Last year we reported on accelerator boards in "Pedal to the Metal" (March '88). This time, we retested accelerator boards to include a number of new products and to see if Apple's recent price increases made it more attractive to upgrade Macs rather than purchase new ones. We also wanted to benchmark Apple's newest and most powerful Mac, the IIx, to see if it was as fast as Apple claims.

So the MacUser Labs subjected 16 accelerator boards to a battery of benchmark tests. These same tests were run on the standard Macs — the Plus, SE, II, and IIx — so you could compare the performance of Apple's stock machines with accelerators ranging in list price from $395 to $3,995. All tests were performed with the optional Motorola 68881 floating-point unit (FPU) installed, with one exception: AOX's DoubleTime-16 does not use an FPU. We found that, for the average user who does not rely heavily on math-intensive programs, this discrepancy does not significantly affect test results. The test results (see Table 1, "Performance Comparison — Normalized") should be judged in relation to a "bare-bones" double-floppy-disk SE with 1 megabyte of memory and no internal hard-disk drive (although a Jasmine external hard-disk drive was used in all tests).

The board, computer, and FPU prices cited in this report are manufacturers' suggested list prices. When presenting total prices, including additional memory required, we considered $400 to be the street rate for 1 megabyte of RAM. But shop around. With a little extra effort, you may be able to accelerate your computing at a discount.

Our conclusions? Before we report our findings, let's take a step back and refresh our understanding of how accelerators work.

How It Happens

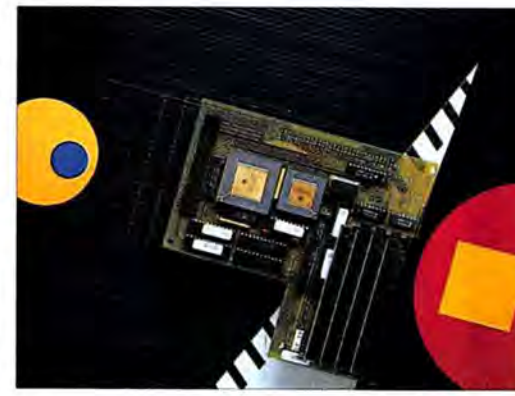
Accelerators improve computer processing using four major methods: speeding up the CPU, upgrading the CPU to one that's more efficient, adding memory, or adding an FPU that computes floating-point math (see sidebar, "Whizzes at Whetstones").

Virtually all our accelerators race their CPUs at 16, 20, or 25 megahertz, which is two to three times the normal 8-megahertz rate of a Plus or SE.

A more thorough way to boost speed is

Mac20MX-16, Mac20MX-25

Requires: Mac SE. Pros: Engineered by NOVY Systems; now available from NOVY and DayStar Digital. Among the best accelerators available on machines with more than 1 Mb. A simple chip swap upgrades you from 16 to 20 or 25 MHz. Cons: Minimum configuration is 1 Mb of additional memory.



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NOVY Systems, Inc.
69 Ravenwood Court
Ormond Beach, FL 32074
(904) 427-2358

Mac20MX-16; $895 (optional 68881, $300)
Mac20MX-25; $1,695 (optional 68881, $700)

Whizzes at Whetstones

It's not just the Jones' envious neighbors who want to accelerate their calculations. Anyone running spreadsheets, graphic artists sitting through recalculations of their on-screen objects, architects drafting buildings with CAD programs, and scientists solving mathematical equations and plotting scatter charts — all can find themselves twiddling their digits while waiting for the Mac to complete its math. It's not surprising that their posture immediately improves when they hear about an M68881 or M68882 floating-point unit (FPU) that performs floating-point math possibly up to 200 times faster than their CPU. And they find ear muscles they didn't know they had when they hear that SEs with accelerators and Standard Apple Numeric Environment (SANE) patches run Whetstones, a math-intensive floating-point benchmark test, nearly 50 times faster than possible on an SE. But it's just the siren's song, right? The seduction of a journey conducted at unimaginable speeds in exotic locales. Passing through the sieve of Eratosthenes.

Well, it's not just mythology. MacUser Labs benchmarked Motorola's new pin-compatible M68882 floating-point chip (used in the new Macintosh IIx) against the M68881. The M68882 benchmarking procedure was to place the chips within a Macintosh II and run an in-house benchmark program ("ErikStones") that performed 50,000 loops of floating-point multiplies, divides, square roots, sines, and logarithms. In order to benchmark Apple's SANE also, our benchmark program was able to route its calls either directly to the 68881/68882 or through SANE.

The results were exciting. Routing the calls directly to the 68881 gave a speed 143 times as fast as SANE, while the 68882 performed 1.5 times as fast as the 68881, or 213 times as fast as SANE. Here is the obvious case for routing floating-point calls directly to the 68881/68882. We applaud Motorola for improving the speed of its floating-point processor while preserving pin compatibility (see Table A, "Apple SANE versus M68881 and M68882").

These results also confirmed our suspicion that some of the accelerator benchmarks were being substantially aided by the use of a **SANE patch.** A SANE patch is an INIT that traps some or all floating-point calls and routes them to the FPU, thus bypassing Apple SANE. We saw test results that were 2.3, 5.6 , 6.9, and — hard to believe — 43.4 times as fast as the SE. Boards with FPUs were out in space, while others running SANE patches along with an FPU were out in hyperspace when measuring Whetstones.

Exaggerated results can indicate an oversight. In this case, we reminded ourselves that even the most math-intensive programs utilize the FPU only 10 to 30 percent of the time. And realistically speaking, a user doesn't sit in a tiny program loop executing hundreds of thousands of floating-point multiplies (see Table B, "SANE Patch Effects on Math-Intensive Programs"). Thus we determined that the Whetstones results skewed the accelerator rankings, which would be misleading for non–math-intensive users.

Consequently, in Table 1, we've provided two "Total Normalized" performance values. One value is based on all of our tests, including Whetstones, and is useful for people who perform floating-point–intensive calculations often and/or who write their own code and can take advantage of the potential speed improvement of 213 times (burst speed from direct FPU routing to an M68882). We also provide a "Total Normalized" value that does not include the results from the Whetstones benchmark, for those who don't use floating-point math.

— Erik Ramberg and Chris Schaefer

Apple SANE versus M68881 and M68882

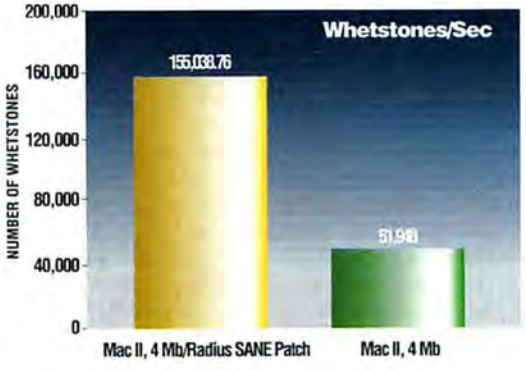
TAB. A

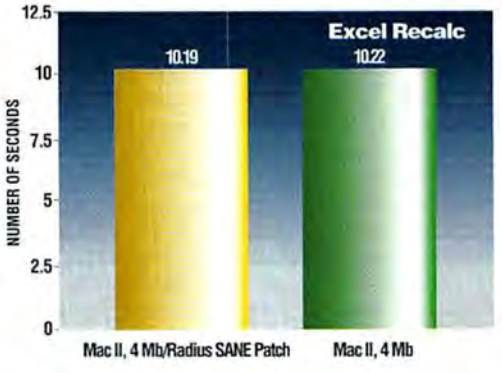
	ErikStones*/Second
Mac II directly to M68881	28,409
Mac II directly to M68882	42,373
Mac II using Apple SANE	198.8

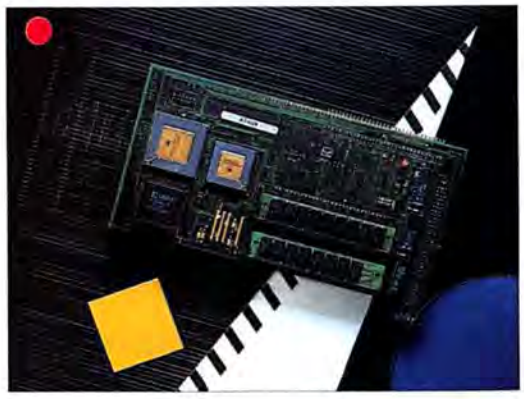
*ErikStones is an in-house benchmark program that performs 50,000 loops of all the floating-point calculations that Motorola's 68881 FPU is capable of performing.

SANE Patch Effects on Math-Intensive Programs

TAB. B







MaraThon 020

Requires: Mac SE. Pros: Allows use of faster memory on the motherboard. Very few components on the board. Generates the least heat and consumes the least power of the boards we tested. Cons: Poor tech support. Board software must be updated every time System software is revised. Minimum configuration is 1 Mb each on motherboard and daughterboard.

Dove Computer
1200 N. 23rd St., Wilmington, NC 28405
(800) 622-7627, (919) 763-7918
$899 (optional 68881, $349)

to upgrade the CPU. All our accelerator boards switch off the 68000 CPU in a Plus or SE and turn on their own CPU. In most cases, that new CPU is a 68020 from Motorola, which has the following advantages over the 68000: a larger (32-bit versus 16-bit) register, an on-chip instruction cache, and the ability to interface directly to a 68881 FPU and to a 68851 Paged Memory Management Unit (PMMU).

All but 4 of the 16 accelerator boards we tested use the 68020. Three of the cards — SuperMac's SpeedCard, AOX's DoubleTime-16, and SiCLONE's Turbo SE — have the same Motorola 68000 that's found in the Plus or SE but double its clock rate from 8 to 16 megahertz. The

Taking Care of IIx Envy



Just when you Mac II owners thought you had reached the top of the heap, along comes Apple with the Macintosh IIx. Our tests show that the 68030-based IIx is the fastest stock Mac — 3.80 times faster than an SE. It's also 21 percent faster than a similarly configured II (which has a speed rating of 3.13), topping Apple's own claim of a 10- to 15-percent gain. We also found the IIx to be particularly fast at loading and recalculating Excel files, sorting a 4th Dimension file, and drawing operations. Oddly, it tests slower at loading and scrolling a Word file (see Table 1).

The IIx is 2.3 times the SE in price but 3.80 times the SE in performance. When $8,667 buys you the CPU, 4 megabytes of memory, a 40-megabyte internal hard-disk drive, monochrome monitor, and video board, the IIx tops the II in price as well as performance. A similarly equipped Mac II would cost $7,367 (see "Meet the Mac IIx," November '88, for a more detailed discussion of this new beast's features).

If these figures depress you Mac II owners, consider accelerating your Mac II by adding a $495 Motorola 68851 Paged Memory Management Unit (PMMU). Unfortunately, our tests showed an overall speed increase of only 3.8 percent, though more noticeable increases were found for loading and scrolling a Microsoft Word document or doing a Macintosh Programmer's Workshop (MPW) compile. Another strategy is to upgrade the coprocessor with the FX-882 from Computer Systems Associates of San Diego, Calif. Currently shipping for $1,290, the FX-882 does not contain a CPU but upgrades the Mac II to Motorola's newer, faster 68882 floating-point coprocessor, which runs at 25 megahertz on the FX-882. The board plugs into the 68881 socket of your Mac II (or into an SE accelerator board). Performance will be enhanced for functions that use floating-point math.

More promising are the announced accelerators that use the 68030 chip, which has a built-in PMMU. The Dove MaraThon 030 is a low-cost solution that puts a 20-megahertz 68030 chip in the Mac II's 68020 slot. The $999 board does not add RAM.

MacPEAK takes a different approach with its $3,495 Orion II. MacPEAK promises a NuBus board with a 20-, 25-, or 33-megahertz 68030 CPU and a 68882 coprocessor. Also on board is a 256K static RAM general-purpose cache, expandable up to 1 megabyte, that MacPEAK says will speed up all applications, including A/UX. And SiCLONE has announced its $3,999 Si3033, scheduled to ship in the first quarter of 1989. Like the MacPEAK board, the Si3033 uses a 33-megahertz 68030 and an instruction cache, but this one is 64K.

The only Mac II accelerator board we were able to acquire at press time was the DayStar 33/030 Accelerator II. The board contains a 33-megahertz 68030 and 68882 and plugs into the Mac II's 68020 slot. It costs $7,000 with the 68882, not including the 4 megabytes of RAM (about $1,600) required to make it run.

The DayStar board's performance was impressive. The Accelerator II more than doubled the overall performance of a 4-megabyte Mac II, was significantly faster than a Mac IIx (Mac II owners should feel gratified), and was more than 6 times faster than the SE. Performance from test to test varied: The MPW Compile and MS Word Load tests were slightly slower than a PMMU-equipped Mac II. But on other tests, the DayStar board just screamed. Performance for the Whetstones (floating-point) test was 6 times faster than on a standard Mac II; recalculating Excel was almost twice as fast; sorting HyperCard, 4.7 times faster; and drawing orbits, 3.4 times faster.

If the performance of DayStar Digital's 33/030 Accelerator II is a harbinger of things to come, Mac II accelerators will truly push the Mac into the low-end workstation market. Mac II owners may be cured of their IIx envy but, as with all therapy, for a price.

— John Rizzo

The Controlled-Use Tests

Most of the test software ran without any problems. Initially we encountered a problem with the MaraThon 020. All applications that tried to access the 68881 resulted in an **ID=16,** which is a floating-point error. After contacting Dove, we were sent a beta release of new software that allowed us to use the floating-point package without a hitch. All tests of SE accelerators were run using the Jasmine Direct Drive 100. Because none of the Mac Plus accelerators functioned with the Direct Drive 100, we opted to use the comparable DataFrame XP 60 for those tests.

Whenever we performed a test that wrote back to the hard disk, we went to the Finder to delete this file before executing another application. This procedure should not have affected the performance of any of the future tests because we did not fragment the hard disk. All tests were performed a minimum of three times, and in some cases many more if we thought there was a problem with a specific test. All the times shown represent the average of all the test results, with the final results normalized to those of the Mac SE.

In all tests, the time interval was measured from the time when we executed the initial command to the time when the cursor changed back from a spinning watch cursor to an I-beam or arrow. All results in Table 1 are in seconds except for Whetstones and Dhrystones, which are presented as the number of Whetstones or Dhrystones per second.

The Tests

• **MS Word Load (version 3.02).** This test was conducted to show the amount of time that elapsed from the Open command of a 100-page Microsoft Word document to the time that the document was fully displayed on-screen.

• **MS Word Scroll (version 3.02).** This test was designed to measure the amount of time used for scrolling a large text document. The time interval started on the Mouse Down command in the scroll bar in the lower right-hand corner. The timing stopped when the cursor stopped flickering, that is, when the body of the text completed scrolling.

• **UnStuff Test (version 1.5.1).** In this test we unstuffed our System folder (System Tools Version 6.0), which took up 466K. We used version 1.5.1 of Raymond Lau's StuffIt program. We selected the folder that had previously been stuffed. The stopwatch started when we selected Save All and ended when the Mac beeped, signifying that the test was completed.

• **Excel Load (version 1.5).** In this test we loaded a 235K Microsoft Excel loan-amortization spreadsheet from a cold start and measured the time it took to load the application template.

• **Excel Recalculation (version 1.5).** We ran this test after completing the Excel Load test. We took the same 235K spreadsheet, entered a load amount of $200,000, and measured the time it took to recalculate.

• **FreeHand Open (version 1.6).** In this test we observed the time needed to open a 60K document created in Aldus' FreeHand. The stopwatch was started when the Open command was executed from the File menu.

• **FreeHand Actual Size (version 1.6).** After completing the previous test, we had the open document on our desktop and then tested to see how long it would take to resize this same image. Instead of fitting it into the window, we chose to display it at actual size. The timing began with the Actual Size command and ended when our watch cursor changed back to an arrow.

• **Macintosh Programmer's Workshop (MPW) Compile (version 3.0A2).** In this test we measured the time it took to compile code equivalent to 500K of disk space. The time began when we executed the Full Build command in Apple's MPW and ended when the spinning beach-ball cursor changed back to an I-beam.

• **Whetstones Test.** This test gave us on-screen results, so no external timing was required. Of these results, we reported only the number of Whetstones per second.

• **Dhrystones Test.** This test gave us on-screen results, so no external timing was required. Of these results, we reported only the number of Dhrystones per second.

• **Orbits Test.** This test gave us on-screen results, so no external timing was required. Of these results, we reported the time involved to completely recalculate drawing the orbit of one object around another.

• **Curves Test.** In this test we chose a 2-bit C curve and measured the time required to draw it. The timing began when the Mouse Up command was given to the type of curve we wanted and ended when the document was completely redrawn.

• **4D Sort (version 1.0.6).** This test was designed to examine a large database sort. We chose a 2,000-card name-and-address file created in ACIUS' 4th Dimension. It consisted of 14 fields. The records were initially sorted by company name, and we tested the amount of time required to sort by phone number. The timing started at mouse-up with the phone number selected and stopped when the end-of-test card appeared in the window.

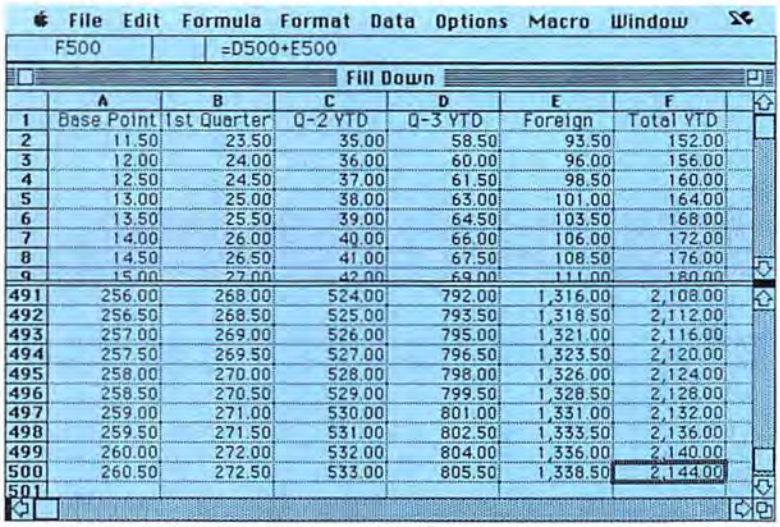
• **MacDraw Redraw (version 1.9.5).** This test was designed to test the amount of time required to redraw a large graphic image. For this test we used a 51K document created in Claris' MacDraw. We loaded the test document and displayed it on the screen. We then selected New from the File menu to cover the initial document with a blank screen. We started clocking the time on mouse-up after clicking on the close box of this blank screen. The timing stopped when the original document window outlined itself again.

• **HyperCard Sort (version 1.2.1).** We used the same 2,000-card file used in the 4th Dimension sort to time a HyperCard sort. The file occupied 636K of memory. Before the test began, we sorted the records by company name. The records started out in identical order every time we performed the test (a total of three times). Then we were ready to start the timing of the phone-number sort. The timing started at mouse-up with the phone number selected. The timing stopped when the Sort icon turned into the Hand icon.

• **FileMaker Find (version 4).** In this test we used FileMaker 4, from Nashoba Systems (now available from Claris). We sorted a 5,000-record database that had 16 fields per record. We did a Find for all dates later than 10/01/88 and measured the time required to find all records meeting this criterion.

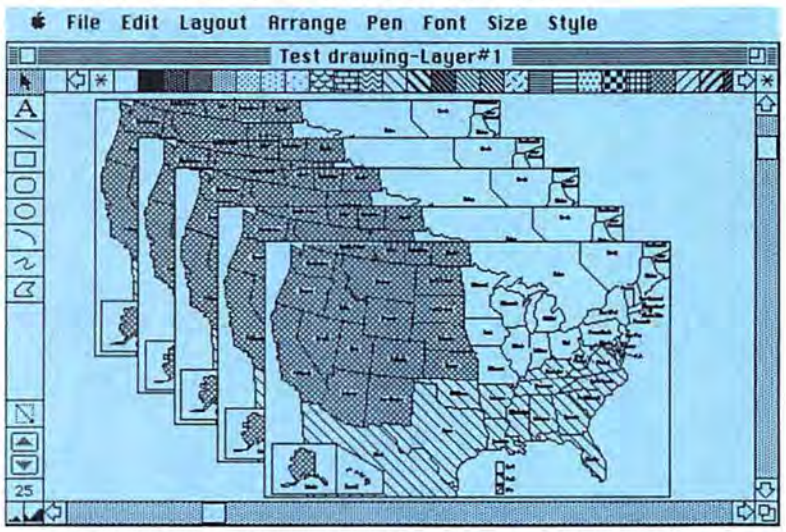
— Tom Santos

Quit wasting time.



	A	B	C	D	E	F
1	Base Point	1st Quarter	Q-2 YTD	Q-3 YTD	Foreign	Total YTD
2	11.50	23.50	35.00	58.50	93.50	152.00
3	12.00	24.00	36.00	60.00	96.00	156.00
4	12.50	24.50	37.00	61.50	98.50	160.00
5	13.00	25.00	38.00	63.00	101.00	164.00
6	13.50	25.50	39.00	64.50	103.50	168.00
7	14.00	26.00	40.00	66.00	106.00	172.00
8	14.50	26.50	41.00	67.50	108.50	176.00
9	15.00	27.00	42.00	69.00	111.00	180.00
491	256.00	268.00	524.00	792.00	1,316.00	2,108.00
492	256.50	268.50	525.00	793.50	1,318.50	2,112.00
493	257.00	269.00	526.00	795.00	1,321.00	2,116.00
494	257.50	269.50	527.00	796.50	1,323.50	2,120.00
495	258.00	270.00	528.00	798.00	1,326.00	2,124.00
496	258.50	270.50	529.00	799.50	1,328.50	2,128.00
497	259.00	271.00	530.00	801.00	1,331.00	2,132.00
498	259.50	271.50	531.00	802.50	1,333.50	2,136.00
499	260.00	272.00	532.00	804.00	1,336.00	2,140.00
500	260.50	272.50	533.00	805.50	1,338.50	2,144.00
501						

Excel with Excel. It takes almost 17 seconds to fill this spreadsheet on the Mac SE. Or less than 4 seconds with the Excelerator XL25 board.



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So. What are you waiting for?



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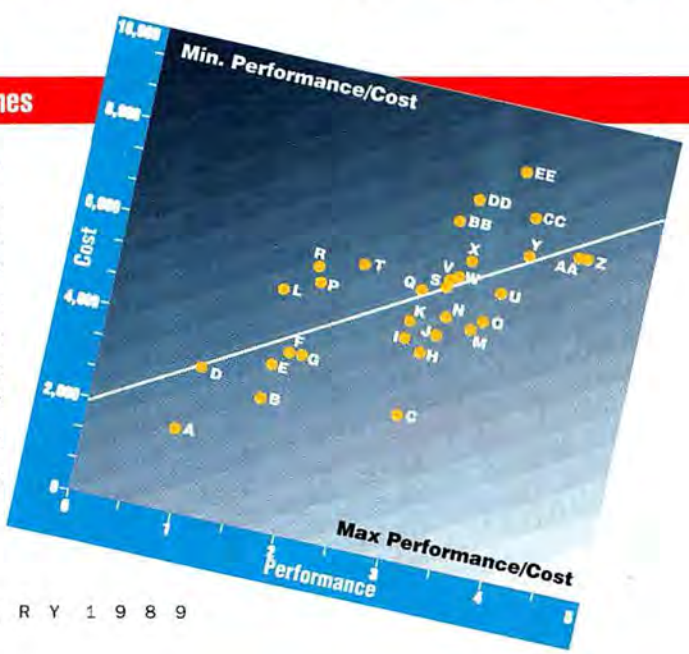
Table 1: Performance Comparison — Normalized

	Configuration as tested	MS Word load	MS Word scroll	UnStuff	Excel load	Excel recalc	FreeHand open	FreeHand actual size	MPW compile
Macintosh Plus	1 Mb	0.76	0.87	0.84	0.86	0.83	0.90	0.87	0.87
SiCLONE MacAdapt, Turbo SE	64K/1 Mb	1.23	1.42	1.37	1.50	1.62	1.23	1.40	1.20
Radius Accelerator 16 Plus	1 Mb	1.62	2.09	2.39	2.06	2.82	2.51	2.63	1.33
Macintosh SE	1 Mb	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AOX DoubleTime-16	1 Mb	1.27	1.52	1.92	1.55	1.71	1.63	1.00	1.47
SiCLONE Turbo SE	64K/1 Mb	1.34	1.65	1.64	1.63	1.92	1.63	1.58	1.49
SuperMac SpeedCard	1 Mb	1.23	1.30	1.77	1.52	1.82	1.64	1.58	1.32
Radius Accelerator 16 SE	1 Mb	1.62	2.09	2.91	2.06	2.82	2.51	2.63	1.67
Radius Accelerator 16 Plus	4 Mb	1.16	1.75	1.52	2.21	2.80	2.25	1.50	1.32
Dove MaraThon 020	1 Mb/1 Mb	2.29	2.47	1.59	1.38	1.82	2.60	2.70	2.63
GCC HyperCharger 020	1 Mb/1 Mb	1.31	1.88	1.77	2.11	3.08	2.09	1.82	1.59
AOX DoubleTime-16	4 Mb	1.12	1.47	1.78	1.63	1.73	1.62	1.62	1.25
Levco Prodigy SE (2Mb)	1 Mb/2 Mb	1.72	2.26	2.88	2.74	3.32	2.98	3.09	2.35
Levco Prodigy 4	1 Mb/ 4 Mb	1.33	2.37	2.46	2.28	3.37	2.80	3.01	1.92
Radius Accelerator 25 SE	1 Mb	1.77	2.35	3.66	2.18	3.67	3.09	3.26	1.80
SuperMac SpeedCard	1 Mb/4 Mb	1.10	1.24	1.62	1.58	1.84	1.61	0.97	1.30
SiCLONE Turbo SE	64K/4 Mb	1.15	1.93	1.18	1.71	1.99	1.39	1.14	1.36
Macintosh II	1 Mb	1.61	1.76	2.56	2.12	2.89	2.47	1.74	2.18
NOVY/DayStar Mac20MX-16	16 MHz,1 Mb/4 Mb	1.78	2.03	2.86	2.41	3.33	2.79	2.79	2.12
Dove MaraThon 020	1 Mb/4 Mb	1.35	2.01	1.82	2.19	3.15	2.18	1.21	1.54
MacPEAK Orion SE 16	1 Mb/4 Mb	1.74	2.71	2.80	2.73	3.58	2.90	3.13	2.12
Radius Accelerator 16 SE	4 Mb	1.44	2.03	2.86	2.13	3.00	2.51	2.61	1.62
GCC HyperCharger 020	1-Mb cache,1 Mb/4 Mb	1.82	2.36	1.62	3.07	3.33	2.64	2.84	2.7 0
Levco Prodigy SE (4Mb)	1 Mb/4 Mb	1.61	2.21	2.87	2.67	3.36	2.94	3.10	2.35
Radius Accelerator 25 SE	4 Mb	1.63	2.29	3.68	2.15	4.00	3.10	3.32	1.75
MacPEAK Orion SE 25	1 Mb/4 Mb	1.69	3.26	2.96	2.99	4.29	3.43	2.44	2.35
NOVY/DayStar Mac20MX-25	25 MHz,1Mb/4 Mb	2.03	2.45	3.55	3.00	4.82	3.71	3.70	2.61
Macintosh II	4 Mb	1.68	1.68	2.54	2.18	2.98	2.45	1.63	2.10
Macintosh IIx	4 Mb	1.58	1.79	3.09	2.80	3.47	2.93	2.21	2.33
Macintosh II	4 Mb, PMMU	2.28	2.25	2.46	2.22	3.02	2.51	1.67	2.76
MacPEAK Orion SE 16	1 Mb/8 Mb	1.72	3.19	2.81	2.91	3.89	3.57	3.72	2.52
DayStar 030 for Mac II*	4 Mb	1.70	3.59	4.26	3.03	6.49	4.15	2.74	2.68

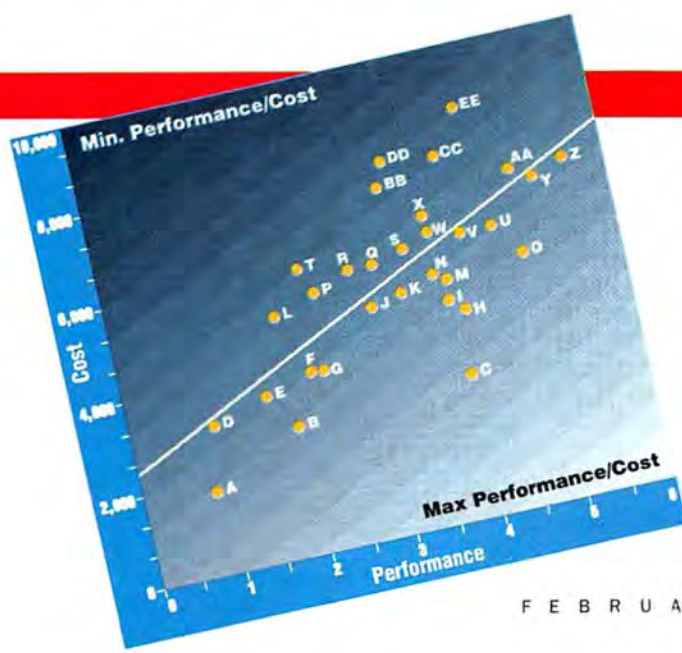
*Preproduction; the only Mac II accelerator board tested.

Performance Not Including Whetstones

In this price/performance graph, Whetstones have not been factored into test results. Performance is plotted on the horizontal axis, price on the vertical. Boards in the right area of the graph offer higher performance, while boards at the top of the graph are more expensive. The most desirable boards (with high performance and low cost) appear in the lower-right area. The diagonal line represents the average price/performance values. Boards below the diagonal line have better-than-average price/performance ratios, while those above the line have below-average ratios.



Whetstones	Dhrystones	Orbits	Curves	4D sort	MacDraw redraw	HyperCard sort	FileMaker find	Total normalized values	Total normalized, no whet	Price/perf. graph order
1.00	0.83	0.99	0.91	0.85	0.92	0.84	0.96	0.88	0.87	A
7.15	1.37	4.57	1.41	1.60	1.30	1.39	1.46	1.95	1.61	B
20.07	2.84	9.97	2.75	2.78	2.86	2.36	2.81	3.99	2.92	C
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	D
1.77	1.87	1.84	1.82	1.71	1.74	1.53	2.01	1.65	1.64	E
8.45	1.65	4.18	1.56	1.78	1.54	1.57	1.78	2.21	1.80	F
10.54	1.71	4.70	1.61	1.74	1.66	1.49	1.77	2.34	1.79	G
20.07	2.84	10.17	2.75	2.78	2.86	2.36	2.96	4.07	3.00	H
20.07	1.87	9.42	2.69	2.46	2.56	5.92	3.04	3.91	2.83	I
2.33	3.35	10.35	2.40	3.36	2.40	3.59	3.58	3.05	3.10	J
6.58	1.81	3.30	1.71	2.11	1.30	4.21	1.58	2.39	2.11	K
4.93	0.73	1.85	1.81	1.73	1.71	4.14	1.75	1.93	1.73	L
11.42	3.40	5.69	2.99	3.66	2.77	7.97	3.78	3.94	3.44	M
13.12	3.40	6.58	2.89	3.57	2.55	6.31	2.76	3.80	3.17	N
24.83	3.47	11.27	3.57	3.47	3.73	2.63	3.08	4.86	3.53	O
9.97	1.93	4.97	1.68	1.77	1.55	3.85	1.95	2.43	1.93	P
17.44	2.52	4.95	1.75	1.78	1.75	1.80	1.97	2.86	1.89	Q
7.14	3.02	6.87	4.87	3.36	2.01	2.56	3.25	3.15	2.88	R
9.62	3.18	4.27	2.77	3.65	2.77	7.32	2.62	3.52	3.11	S
1.91	1.91	5.82	1.64	2.03	1.47	4.36	1.97	2.28	2.31	T
18.56	3.20	10.17	2.94	3.12	2.67	7.93	2.96	4.58	3.65	U
20.07	2.84	10.06	2.73	2.59	2.66	5.85	2.12	4.20	3.14	V
12.06	3.20	5.34	2.80	3.15	2.52	7.80	3.16	3.78	3.22	W
11.41	3.46	5.68	3.00	3.23	2.82	6.28	4.03	3.81	3.31	X
24.93	3.47	11.33	3.57	3.43	3.75	7.26	2.64	5.14	3.82	Y
23.32	4.14	12.73	3.66	3.70	3.50	9.53	4.35	5.52	4.33	Z
13.57	4.82	6.27	3.95	4.81	4.02	10.14	4.59	4.88	4.30	AA
7.17	3.02	6.90	4.87	3.13	2.18	6.84	2.79	3.38	3.13	BB
8.29	3.84	7.96	6.38	4.10	2.60	8.12	3.87	4.08	3.80	CC
7.10	3.02	6.83	4.84	2.69	2.29	6.84	3.01	3.49	3.25	DD
16.29	2.85	5.37	2.89	4.01	2.56	9.05	3.49	4.43	3.64	EE
42.45	6.91	23.39	10.25	4.27	5.03	12.03	7.84	8.80	6.56	



Performance Including Whetstones

In this price/performance graph, Whetstones have been included. Performance, represented by total normalized values relative to a Mac SE, is plotted on the horizontal axis (the SE has a value of 1). Price is plotted on the vertical axis. Some boards, such as the Radius boards (V and Y), move to the better-than-average side of the diagonal line when Whetstones are factored into the test results.

fourth board, DayStar Digital's 33/030 Accelerator II, is based on the 68030 CPU — the same one used in Apple's fastest Macintosh, the new Mac IIx (see sidebar, "Taking Care of IIx Envy").

Accelerator boards also gain speed by adding more memory than is normally available on the motherboard. For example, with the MacPEAK Orion SE boards, your Mac can hold up to 8 megabytes, doubling the capacity of a standard SE. This additional memory can be a real benefit because an entire program, and all its associated files, may be stored in the CPU's main memory, which is a good deal faster than disk-based memory.

Another speed gain comes from on-board memory caches, which typically consist of 16K to 32K of fast, static RAM. Using this cache, the CPU obtains data in a fraction of the time it would take from a Mac's normal RAM (see sidebar, "Cache On Delivery").

The fourth method of gaining speed is through a Motorola 68881/68882 FPU, which can reportedly improve floating-point–math operations 10 to 200 times over a lone CPU. Since there's no way to add an FPU to a normal Plus or SE directly, an accelerator board is needed to make this improvement.

Cautionary Notes

When using MacUser Labs' benchmarks to assist you in buying an accelerator, you need to weigh averaged, normalized results against what a specific accelerator does best. Take a close look at Table 1 (see sidebar, "The Controlled-

Cache on Delivery



Amidst all the razzle-dazzle over accelerator boards, FPUs, and PMMUs, the ever-present strategy of using a cache to speed up processing is nearly overlooked, like the humble kid on the team who does a lot of the work and gets none of the credit. The fact is, caching is the original accelerator, still present in the processing chain under various incarnations: RAM caches, data caches, instruction caches, and so on.

Its humblest incarnation, the Control Panel RAM cache, was one of the earliest strategies for speeding up disk access on the earlier Macs. Today, with high-speed hard drives, slow disks are not quite as evident and using the RAM cache is less of a boon. But back in the days of 400K drives, small applications, and no hard-disk drives, the RAM cache did wonders. Cache strategy is simple: Memory storage space, which has a faster access time than the normal memory storage space, is allocated for certain operations.

The standard Apple Control Panel RAM cache allows data from frequently accessed locations on a disk to be stored in RAM for the duration of its use. This method speeds up effective disk-access time by two or three orders of magnitude. The danger in using the Control Panel RAM cache is that, if unsaved data is in the RAM cache and power to the computer is lost, the data is lost along with it.

Another type of cache will become more important to Mac users as the Mac develops: the CPU cache. A CPU cache is either a data or an instruction cache. These caches allow today's speedier microprocessors to operate at higher speeds than they would while waiting for RAM. This is mainly a cost- and space-saving measure because high-speed normal RAM, although available, is expensive and takes up a considerable amount of space.

An instruction cache is implemented internally in the 68020 microprocessor and is one of the reasons a 68020 is a faster machine than the 68000. The 68020's instruction cache allows the Arithmetic Logic Unit (ALU) to fetch instructions directly from cache instead of from slow memory. If the processor is in a small program loop, Motorola claims that burst mode speeds can exceed 12.5 million instructions per second. (The 68030 adds a data cache to the processor.)

In short, the speed rating of RAM forces the internal bus to wait in order to ensure that the data has come out of the memory chips during a memory access. If the RAM is significantly slower than the processor, the processor must use a **wait state**, in which the processor waits for memory. A wait state is one clock cycle. In a run-of-the-mill Macintosh II, the memory requires one wait state, but Apple engineers cause an additional wait state to ensure that the data arrives intact. The elimination of a wait state in a memory-access cycle can result in a significant increase in performance.

A static RAM cache usually eliminates these wait states. Usually, the cache contains the information, whether it is instructions or data that the processor is looking for. An access in which this takes place is called a **cache hit.** A **cache miss** occurs when the particular information the processor needs is not contained in the cache and the processor must go to memory to get it. The ratio of cache hits to cache misses determines how effective the cache really is.

Cache data typically is stored in lines of bytes. A line can be of any length but is usually a value such as 8, 16, 32, or 64 bytes. Some larger computers, such as some of the Sun workstations, use cache lines of 128 bytes. Normally, an instruction requires only 16 bits of data. But the cache can load in 32 bits of data per cycle on a 68020. Twice the number of bits means that the cache can access memory at only half the speed and still provide the processor with the instructions it needs.

Furthermore, though not yet implemented on the Macintosh II — although it may be eventually, or a board may implement it — the 68020 cache has the ability to perform burst-mode transfers. This mode allows only one address to be sent to memory, which then sends that address back to the processor, increments the address, then sends the next address to the processor, and so on.

All in all, a cache is an efficient and relatively cheap way to increase the speed of a machine. Consequently, you'll notice that many of the best accelerators are the boards that make effective use of caching. Here's a case in point: DayStar Digital's accelerator board for the Macintosh II, the 33/030 Accelerator II, uses 32K of cache and yields three times the performance of a standard Macintosh II.

— Erik Ramberg and Chris Schaefer

HyperCharger 020



Requires: Mac SE. Pros: Fast and affordable. All RAM on daughterboard and motherboard is contiguous and accessible from the Finder (up to 4 Mb). Can operate in native 68000 mode. Can copy ROM into fast RAM. Allows use of full-page display. Also allows use of either surface-mounted SIMMs or the larger DIP SIMMs. Cons: Minimum configuration is 1 Mb each on the motherboard and daughterboard.

GCC Technologies
580 Winter St., Waltham, MA 02154
(617) 890-0880
$999 (optional 68881, $400)

Use Tests," for an explanation of the 16 tests performed). For example, loading a Microsoft Word document with an accelerator installed increased the speed of the operation only 1.6 to 1.7 times that of an SE (about a 60- or 70-percent improvement).

Is it worth spending $1,000 to $3,000 for that gain in speed? Is it worth the money if all you do is word processing? And if you find yourself on a lower rung of the Macintosh ladder — with your 128K, 512K, or 512KE Mac — is it worth paying a fortune for RAM to climb up to a Plus, and which accelerator should you buy once you get there?

Furthermore, we suspect lots of people buy accelerators hoping to see blinding-fast spreadsheet recalculations. So we tried Excel, since it's the current leader of the pack of Macintosh spreadsheets. But Excel failed to address the FPU (see Table B, "SANE Patch Effects on Math-Intensive Programs," in sidebar "Whizzes at Whetstones").

We contacted Microsoft, which promised to supply registered owners of Excel with a free upgrade that will utilize any FPU mounted on an accelerator. If you're a CPA and your bread and butter is using Excel along with your accounting package, but you still need the portability of an SE when visiting clients, you might take a look at the Mac20MX-25. This accelerator was originally engineered by NOVY Systems and is now available from both NOVY and DayStar Digital. It uses up to 4 megabytes of memory ($3,995 with 4 megabytes and the optional FPU; $1,695 for the board alone) and recalculates our Excel spreadsheet 4.8 times faster than a stock SE. But don't overlook the lower-priced offerings. Even SiCLONE's $398 Turbo SE improves Excel recalculations by 1.92 times (a 92-percent gain), without using the optional FPU ($298). Adding the FPU and the revised version of Excel could add another 30 percent.

How We Tested for Speed

MacUser Labs conducted 14 applications tests and 2 standard benchmark tests (*Whetstones* and *Dhrystones*) using two different board configurations: 1 megabyte of memory and 4 megabytes of memory. This tests a combination of floating-point processing power (Whetstones) and CPU performance (Dhrystones).

Each test was conducted three times, and the results were averaged. We then picked the best-performing configuration, which generally turned out to be 4 megabytes with cache turned on, and used those test results in Table 3, "Performance Summary."

Note that Table 1 contains a recalculation (*normalization*) of the original results so that, in all cases, the SE's test results equal 1.0. If, therefore, a particular test or price has a figure of 3.1, that means the combination of that particular computer and accelerator board performed 3.1 times as fast as an SE or costs 3.1 times as much as an SE. This method makes it relatively easy to compare our test results.



Prodigy

Requires: For Prodigy SE, Mac SE; for Prodigy 4, Mac 512KE or Mac Plus. Pros: Have built-in FPUs and true 68000 emulation mode for programs that are incompatible with the 68020. Configuration software is available as a cdev. Motherboard memory is accessible as a RAM disk. Documentation is excellent. Cons: Daughterboard memory uses custom memory modules available only from Levco. Motherboard and daughterboard RAM are not contiguous.

Levco
6160 Lusk Blvd., Suite C-100, San Diego, CA 92121; (619) 457-2011
Prodigy SE (2Mb); $1,999. Prodigy SE (4Mb); $3,099. Prodigy 4; $3,499.

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CEO, Nimbus Systems
User Name: NIMESIS

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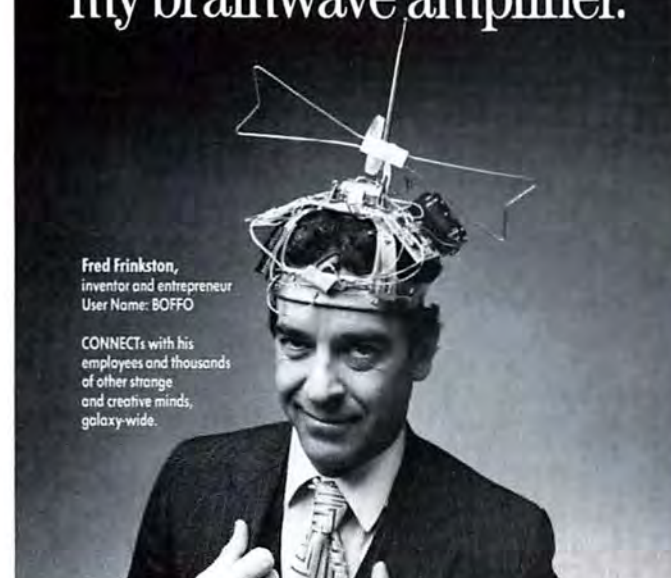
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Table 2: Hardware and Software Features

	Computer	Clock speed	Mother-board memory	Maximum accelerator memory	Static RAM cache	ROM sockets	CPU
Macintosh II		15.67	1 Mb				68020
Macintosh IIx		15.67	4 Mb				68030
Macintosh Plus, 1 Mb		7.83	1 Mb				68000
Macintosh SE, 1 Mb		7.83	1 Mb				68000
AOX DoubleTime-16	SE	15.67	1 Mb		yes	no	68000
DayStar Digital 33/030	II	33.33	4 Mb		yes	no	68030
GCC HyperCharger 020	SE	15.67	1 Mb	4 Mb	no	no	68020
NOVY/DayStar Digital Mac20MX-16	SE	15.67	1 Mb	4 Mb	no	no	68020
NOVY/DayStar Digital Mac20MX-25	SE	25.67	1 Mb	4 Mb	no	no	68020
SiCLONE MacAdapt, Turbo SE	512K, Plus	15.67	512K, 64K	4 Mb	no	yes	68000
Dove MaraThon 020	SE	15.67	1 Mb	4 Mb	no	no	68020
MacPEAK Orion SE 16	SE	15.67	1 Mb	8 Mb	no	yes	68020
MacPEAK Orion SE 25	SE	25.67	1 Mb	8 Mb	no	yes	68020
Levco Prodigy 4	Plus	15.67	1 Mb**	4 Mb	no	no	68020
Levco Prodigy SE (2Mb)	SE	15.67	1 Mb**	4 Mb	no	no	68020
Levco Prodigy SE (4Mb)	SE	15.67	1 Mb**	4 Mb	no	no	68020
Radius Accelerator 16 Plus	Plus	15.67	1 Mb		yes	no	68020
Radius Accelerator 16 SE	SE	15.67	1 Mb		yes	no	68020
Radius Accelerator 25 SE	SE	25.67	1 Mb		yes	no	68020
SuperMac SpeedCard	SE	15.67	1 Mb		yes	no	68000
SiCLONE Turbo SE	SE	15.67	64K	4 Mb	no	yes	68000

*The cost of memory is included in the base price of this configuration.
**These products come with nonstandard 1-Mb memory modules. Memory on these boards cannot easily be removed and put into another machine.
***"Not necessary" means there is no functional reason for this option to be implemented.

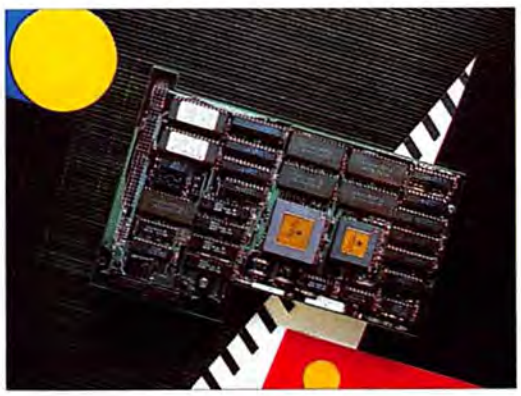
Orion

Requires: Mac SE. Pros: The 25-MHz version is the fastest SE board available. Daughterboard RAM can be upgraded to 8 Mb. ROMs can be copied into fast RAM. PMMU option allows use of A/UX. Cons: Minimum configuration is 1 Mb each on motherboard and daughterboard. Unclear manual.

MacPEAK Systems
1201 Spyglass Drive, Austin, TX 78746; (512) 327-3211
SE 16; $795 (optional 68881, $295). SE 20; $995 (optional 68881, $495). SE 25; $1,595 (optional 68881, $895; optional 68882, $795).



68881 Option	Warranty	Price without memory	Price with memory	Control Panel cdev	8-MHz 68000 mode	SANE patch/ INIT	RAM disk software	Formatting software
STD	3 months	$5,767	$7,367		no	no	no	
STD	3 months	$8,667*	$8,667*		no	no	no	
no	3 months	$1,799*	$1,799*		yes			
no	3 months	$3,169*	$3,169*		yes			
yes	6 months	$395	$1,995	yes	not necessary***	no	no	no
68882	6 months	$7,000	$8,600	yes	no	yes	no	no
yes	3 months	$1,399	$2,999	yes	yes	yes	no	no
yes	6 months	$1,195	$2,795	no	yes	yes	yes	yes
yes	6 months	$2,395	$3,995	no	yes	yes	yes	yes
yes	12 months	$994	$2,594	yes	not necessary***	yes	no	no
yes	3 months	$1,199	$2,799	yes	yes	yes	yes	no
yes	12 months	$1,094	$2,694	yes	yes	yes	yes	no
yes	12 months	$2,390	$5,590	yes	yes	yes	yes	no
STD	12 months	$3,499*	$3,499*	yes	yes	yes	yes	no
STD	12 months	$1,999*	$1,999*	yes	yes	yes	yes	no
STD	12 months	$3,099*	$3,099*	yes	yes	yes	yes	no
yes	12 months	$1,295	$2,895	no	no	yes	no	no
yes	12 months	$1,295	$2,895	no	yes	yes	no	no
yes	12 months	$2,195	$3,795	no	yes	yes	no	no
yes	12 months	$699	$2,299	yes	not necessary***	yes	no	no
yes	12 months	$696	$2,296	yes	not necessary***	yes	no	no

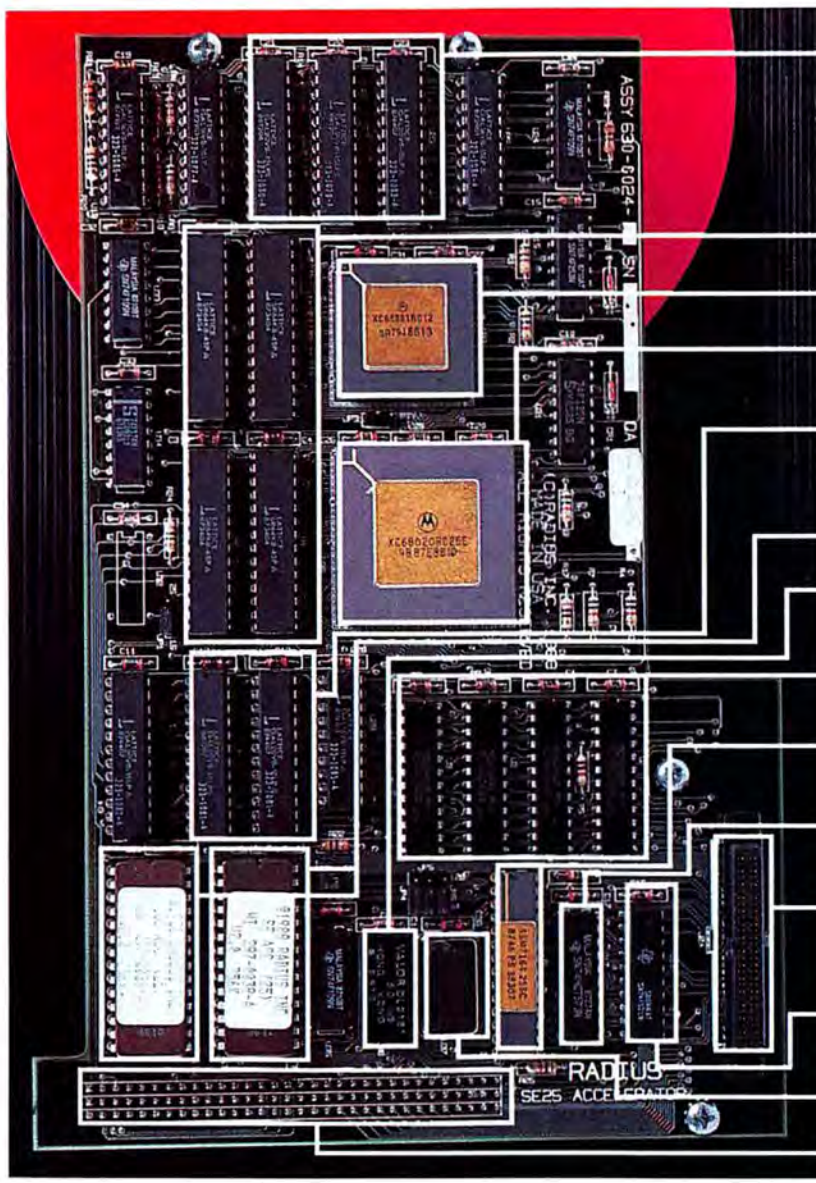


Accelerator

Requires: Mac Plus, Mac SE. Pros: Requires no additional memory. Uses a static RAM cache that enables high-speed access to ROM loaded into RAM. Radius SANE is the fastest SANE patch currently available. Can hook up only Radius Large Screen Displays as secondary devices. Cons: Mac Plus version has compatibility problems with a variety of hard disks. Contact manufacturer for list of drives. Neither PC drive card nor EtherTalk connector can be attached.

Radius, Inc.
1710 Fortune Drive, San Jose, CA 95131; (408) 434-1010
16 Plus; $995 (optional 68881, $300). 16 SE; $995 (optional 68881, $300). 25 SE; $1,695 (optional 68881, $500).

Anatomy of an Accelerator Board



Programmable logic arrays (PALs)

45-ns static RAM

12-MHz 68881 math coprocessor

25-MHz 68020 processor

Address bus buffer allows communication between the motherboard and the daughterboard.

Radius ROMs

50-ns delay is used for bus gymnastics. This is used for delaying the control signals.

Bus buffer allows full 32-bit data transfer.

Cache tag RAM stores information to determine whether a cache hit has occurred.

Address latch holds address during cache-miss memory access.

Radius Magic Bus Connector allows future expansion of a variety of large-screen displays.

Address comparator is used in cache-hit determination.

51.27-MHz crystal

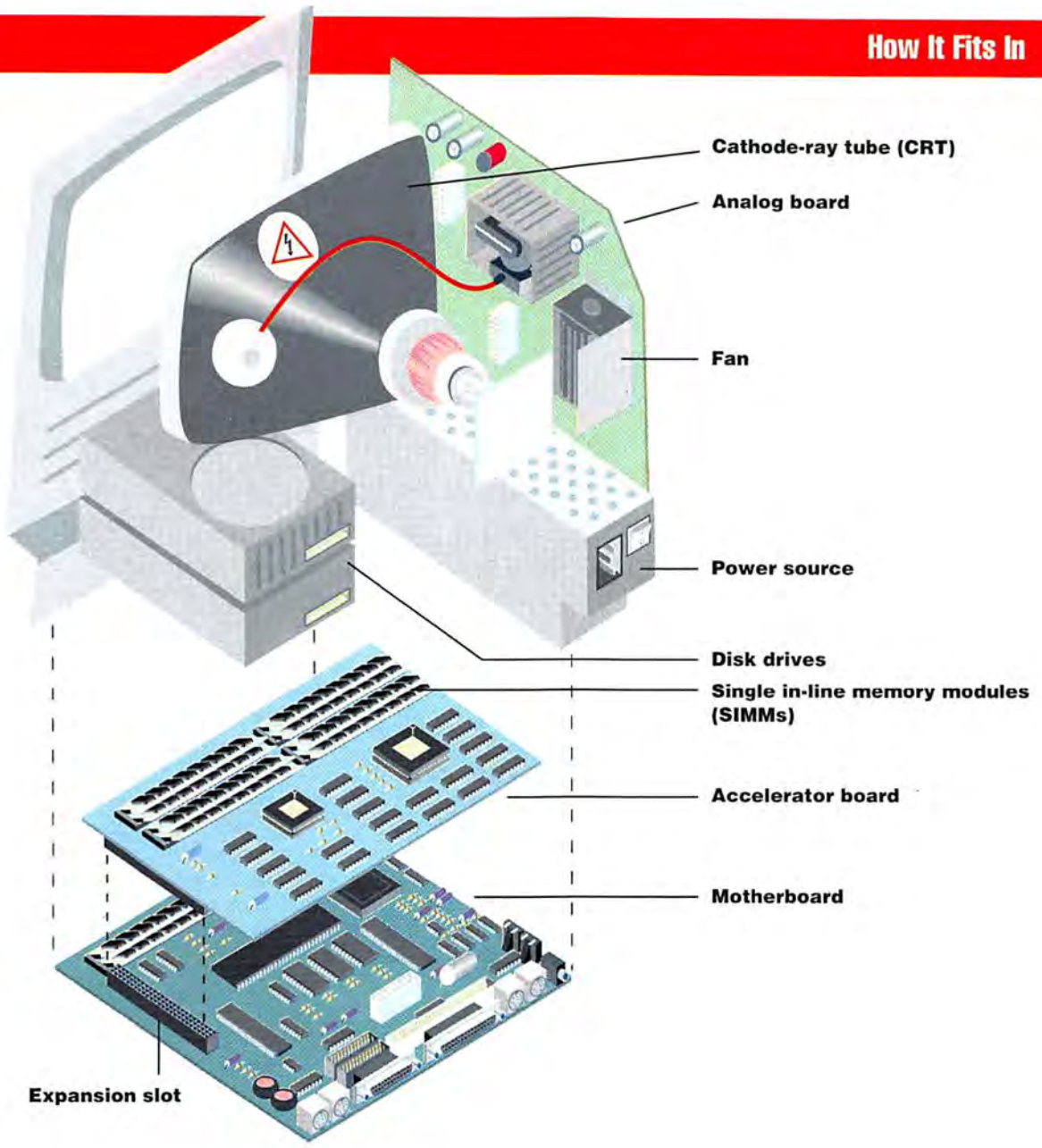
SE bus connector (96 pin)

Also note that the total normalized values in Table 1 are given in two columns: one with Whetstones and one without. Whetstones is not a regular Mac application. It's a laboratory-created test that consists almost entirely of floating-point calculations. Since even the most math-intensive program uses these calculations only 15 to 30 percent of the time, we left out Whetstones when giving you overall figures about a board's performance. We think the resulting units of performance more accurately represent what you will experience when you install an accelerator board and run regular applications. Another reason we omitted Whetstones was to avoid skewing the total values on board performance. Whetstones resulted in figures ranging up to 42 times the speed of an SE because of the FPU, compared with other tests that yielded figures around 4 or 5 (see sidebar, "Whizzes at Whetstones").

Test Results

Overall, the results show that it took a bare-bones SE a total of 25.7 minutes to complete our battery of tests, compared with 6.5 minutes for an SE running any of the fastest accelerator boards. That's a savings of nearly 20 minutes, with a speed rating averaging 3.9 times that of an SE. And the fastest SE accelerator —

How It Fits In



MARK W. SWEENEY / MACUSER

MacPEAK's Orion SE 25 — tops that. It uses a 68020 CPU operating at 25 megahertz, and with 4 megabytes of RAM it gave an overall performance 4.33 times as fast as an SE (and .53 times faster than a Mac IIx). Look at Table 1 to see how much of a speed improvement it is over the SE: Scrolling a Word file, 3.26 times; recalculating an Excel spreadsheet, 4.29 times; drawing an orbit, 12.73 times; sorting a 4th Dimension file, 3.70 times; redrawing a MacDraw file, 3.50 times; and sorting a HyperCard stack, 9.53 times.

That's an impressive performance, but for a price. The Orion SE 25 will put you out $3,890 for the board, optional FPU, and 4 megabytes of memory ($1,595 for the board alone). When the board is installed inside a new floppy-drive SE (which lists for $3,169), the total price becomes $7,059. Such considerable expense raises that million-dollar question, "Should I buy an SE and install a fast accelerator board or purchase a Mac II or IIx?" A similarly configured Mac II — with 4 megabytes of memory, a 12-inch monochrome monitor, and video board — costs $7,367, which is only $308 more than the Orion-equipped SE. If you buy the Mac II, you'll have six expansion slots, the potential for color, and speed that's 3.13 times faster than the basic SE. But if you install the Orion SE 25 in an

Table 3: Performance Summary*

	Fastest accelerator board	Board speed	SE speed	Speed increase
MS Word load	MaraThon	2.6	6.1	2.3
MS Word scroll	Orion SE 25	64.0	208.9	3.3
UnStuff	Radius 25 SE	30.7	112.9	3.7
Excel load	HyperCharger 020	16.8	51.5	3.1
Excel recalculation	Mac20MX-25	6.3	30.4	4.8
FreeHand open	Mac20MX-25	20.4	75.7	3.7
FreeHand actual size	Orion SE 20/16	5.0	18.5	3.7
MPW compile	Mac II, 4 Mb (PMMU)	136.4	377.2	2.8
Orbits	Orion SE 25	6.8	86.5	12.7
Curves	Mac IIx	7.3	46.8	6.4
4D sort	Mac20MX-25	33.2	159.6	4.8
MacDraw redraw	Mac20MX-25	24.5	98.4	4.0
HyperCard sort	Mac20MX-25	20.5	208.1	10.1
FileMaker find	Mac20MX-25	13.3	61.2	4.6

*All times given in seconds.

SE, you'll blast through applications at an average rate 4.33 times faster than the basic SE. Could be a tough decision.

Two other hot boards for the SE as shown in our tests are the NOVY/DayStar Digital Mac20MX-25 and Radius' Accelerator 25 SE. Both were run with 4 megabytes of RAM. Their performance was 4.30 and 3.82 times that of an SE for $3,995 and $3,795, respectively; the prices include 4 megabytes of add-on memory. (Note: The Radius itself doesn't hold any RAM.) Notice that the Mac20MX-25 did especially well at recalculating the Excel file, sorting a 4th Dimension file, and sorting a HyperCard file. Nor should you overlook the Radius 25 SE from another perspective: Not only is it very fast if you add 4 megabytes of memory to the motherboard, but it's also our fastest board at 1 megabyte of memory on the SE. At $2,195 with the optional FPU and 1 megabyte of memory, combined with performance 3.53 times as fast as that of an SE, the Radius 25 SE moves into our Best Buy category. (Add another $1,600 to this price for the 4-megabyte configuration.)

The Radius 16 SE is another Best Buy, costing $1,295 with the optional FPU and giving you 3.00 times the speed of an SE. Also in the Best Buy category for SE owners are SuperMac's SpeedCard and SiCLONE's Turbo SE, which both provide approximately 1.80 times the speed of an SE for prices under $800, including the price of the optional FPU.

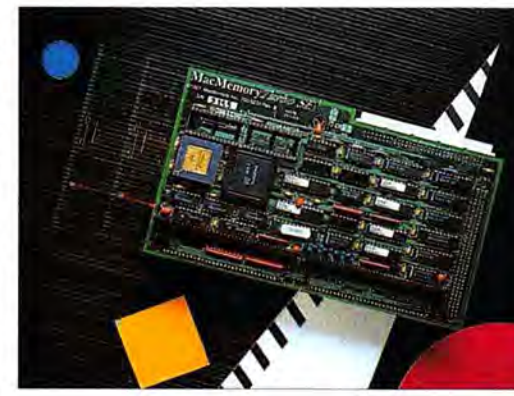
No matter how your Mac is configured, look over the results of our lab tests — you may find just the right combination of price and performance for your Mac applications. ■

GIL DAVIS IS THE ASSOCIATE EDITOR FOR MACUSER. KUDOS TO FEATURES EDITOR MICHAEL MILEY AND TO MACUSER LABS CONSULTANTS ERIC ERICKSON, ERIK RAMBERG, TOM SANTOS, AND CHRIS SCHAEFER.

Turbo SE

Requires: For Mac 512KE or Mac Plus, MacAdapt expansion chassis and Turbo SE accelerator; for Mac SE, Turbo SE. Pros: Requires no additional memory. Allows the use of motherboard memory on the daughterboard by using two 32K video SIMMs installed into SIMM slots 3 and 4. Appears to work well with most programs generating sound. Cons: Four 256K SIMMs are required for the Mac 512KE — an expensive upgrade. But you'll notice a considerable speed increase and get a SCSI port out of the deal.

SiCLONE
1169 Borregas Ave., Sunnyvale, CA 94089; (408) 734-9151
MacAdapt; $298. Turbo SE; $398 (optional 68881, $298).



Testers' Choice

Highest Performance

For Plus owners:

Radius' Accelerator 16 Plus (1 megabyte)
Gives 2.92 times the performance of an SE.
Price: $3,094, board, FPU, and computer; $1,295, board and FPU.

For SE owners:

First Place (Tied):

MacPEAK's Orion SE 25 (4 megabytes)
Gives 4.33 times the performance of an SE.
Price: $7,159, board, FPU, and computer; $3,990, board and FPU.

First Place (Tied):

NOVY's/DayStar Digital's Mac20MX-25 (4 megabytes)
Gives 4.30 times the performance of an SE.
Price: $7,164, board, FPU, and computer; $3,995, board and FPU.

For Top-End Purchasers:

Mac II with DayStar Digital's 33/030 Accelerator II (4 megabytes)
Gives 6.56 times the performance of an SE.
Price: $14,367, board, FPU, and computer; $8,600, board and FPU.

Best Buys

For Plus owners:

Radius' Accelerator 16 Plus (1 megabyte)
Gives 2.92 times the performance of an SE.
Price: $3,094, board, FPU, and computer; $1,295, board and FPU.

For SE owners with 1 megabyte:

First Place:

Radius' Accelerator 25 SE (1 megabyte)
Gives 3.53 times the performance of an SE.
Price: $5,364, board, FPU, and computer; $2,195, board and FPU.

Second Place:

Radius' Accelerator 16 SE (1 megabyte)
Gives 3.00 times the performance of an SE.
Price: $4,464, board, FPU, and computer; $1,295, board and FPU.

Third Place (Tied):

SiCLONE's Turbo SE (1 megabyte)
Gives 1.80 times the performance of an SE.
Price: $3,865, board, FPU, and computer; $696, board and FPU.

Third Place (Tied):

SuperMac's SpeedCard (1 megabyte)
Gives 1.79 times the performance of an SE.
Price: $3,967, board, FPU, and computer; $798, board and FPU.

For SE owners with more than 1 megabyte:

First Place:

Levco's Prodigy SE (2 megabytes)
Gives 3.44 times the performance of an SE.
Price: $5,168, board and computer; $1,999, board alone.

Second Place:

MacPEAK's Orion SE 16 (4 megabytes)
Gives 3.65 times the performance of an SE.
Price: $5,859, board, FPU, and computer; $2,690, board and FPU.

Third Place (Tied):

MacPEAK's Orion SE 25 (4 megabytes)
Gives 4.33 times the performance of an SE.
Price: $7,159, board, FPU, and computer; $3,990, board and FPU.

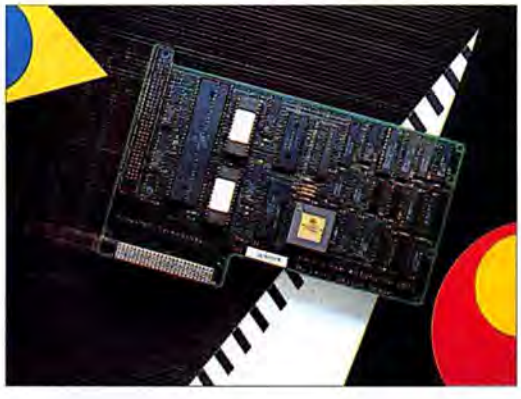
Third Place (Tied):

NOVY's/DayStar Digital's Mac20MX-25 (4 megabytes)
Gives 4.30 times the performance of an SE.
Price: $7,164, board, FPU, and computer; $3,995, board and FPU.

For New Purchasers:

Macintosh Plus with Radius' Accelerator 16 Plus (1 megabyte)
Gives 2.92 times the performance of an SE for slightly less than an SE's price.
Price: $3,094, board, FPU, and computer; $1,295, board and FPU.

Note: Total prices are based on Apple's suggested list prices of $1,799 for a Plus and $3,169 for an SE. If 4 megabytes of RAM is indicated, an extra $1,600 is included in the total price. All prices are suggested by the manufacturer. Discounts may be available.



SpeedCard

Requires: Mac SE. Pros: Great low-cost alternative. Requires no additional memory. Allows full use of memory on the motherboard and full compatibility with all programs that don't work with the 68020. Allows use of many different large-screen displays (except Radius). You can use either the Apple PC drive card or the EtherTalk card for the SE. Colorvue SE will also function on this card. Cons: Heck, we can't think of any.

SuperMac Technologies
295 N. Bernardo, Mountain View, CA 94043
(415) 964-8884
$399 (optional 68881, $399)

How to speed up your accounting cycle



Whether you're shopping for your first computerized accounting system or making do with some other "solution", you owe it to yourself to see why Bedford's Simply Accounting is the fastest way to get your small business from transaction to report.

"Simply Accounting is one of the best all-in-one programs"

Macworld October 1988

Quick to setup...

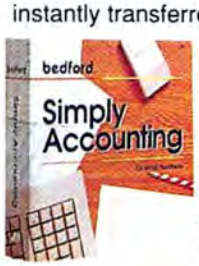
Installation is as easy as copying the program onto a working diskette and double-clicking the icon.

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Within minutes you will be moving easily through the six fully integrated functions using only your mouse. The sample accounting records and self-paced tutorial allow you to get comfortable with the program before entering your own company's data.

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With Simply Accounting you'll need to enter transactions only once. Payroll, Payables and Receivables data are instantly transferred to General Ledger, Inventory and Jobcost as required.



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Unlike software that was never built for speed, Macintosh™ based Simply Accounting has been optimized to give your small business the boost it needs.

"small businesses owe it to themselves to give this product a hard look"

MacUser September 1988

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THE HELP FOLDER

BY CHRIS ESPINOSA

Got a Mac problem? Something you'd like explained? Something you can't find the answer for anywhere else? Apple's Chris Espinosa will answer your questions every month in this space. When the questions are too tough or too esoteric for him, he'll get the answers from other members of the Mac team. So ask what you need to know and get your answers straight from the source!

Send your questions to Chris, c/o MacUser, *950 Tower Lane, 18th floor, Foster City, CA 94404. Chris will read all your questions, but, unfortunately, he may not be able to answer individual queries.*

ULTRA SECURE WITH HYPERCARD

Q. Help! I have a big problem, and I really hope you can help me. The problem is simple — I have a HyperCard stack that I foolishly protected, and I forgot the password. Yes, I know that the HyperCard manual states that there is no way to gain access without the password. Correct me if I'm wrong, but it can't be encryption. I would think it is only a "locked door." Is it then possible to use some editor to change some simple 1 to a 0 and have there be no more password? I have tried three programs so far. ResEdit and FEdit both didn't work; they said that neither the resource fork nor the data fork had sectors allocated. MacTools was at least able to view my file, but it couldn't remove the protection. You're my last hope!
GIDEON TURNER
MORRISTOWN, N.J.

A. There's no hope. Sorry. When you protect a stack with HyperCard, it uses your password as a key to scramble the first couple of blocks in the data fork of the file that contains the stack. While this could be an extremely small percentage of the information in the file, it's an extremely important percentage: It's a list of "pointers" to the rest of the information in the file. With those pointers scrambled, no program (or programmer!) has a chance of finding out which parts of the file are valid and which are just artifacts of previous edits.

When you open a protected HyperCard stack and supply a password, HyperCard uses the password to descramble the first few blocks. If the password is right, then the descrambled pointers comes out correct; if it's wrong, the pointers are meaningless, and HyperCard can't understand the file.

There's no simple bit to set to remove the password, because HyperCard never stores the password anywhere.

I don't understand why FEdit and ResEdit wouldn't let you see the file. The entire file, including the few encrypted blocks, are fully accessible to both those programs. (Using FEdit on a protected file, you can read the text in the fields and scripts of the protected stack. This will help you recover some of the text, especially if the stack was compacted before it was protected.) Perhaps your protected file was damaged in some other way, and you really didn't forget the password?

Some advice: Make an unprotected backup copy of a stack before you protect it, and lock up the backup copy in a secure place, such as a safe-deposit box or a locked desk. And don't lose the key.

HOW SERIAL IS SERIAL?

Q. Many times I have gotten excellent tips from your column. But in your October '88 "MacBottom Up" response, you replied to Mr. Harris that " . . . no Mac is able to start up off a serial device without the help of a floppy disk." I have a Mac 512KE with one of the original Apple HD20 serial drives, and when I start the HD20 first, wait 20 seconds or so, then turn on the Mac, it fires right up. Is my Mac possessed?
PATRICK COLLINS
SAN FRANCISCO, CALIF.

A. Yours was one of many letters I got this month about "serial" disk drives (some letters a little nastier than others). And even my good old editor at *MacUser* questioned the answer when I first wrote it. So maybe I'd better explain . . . .

The original Apple HD20 disk drive connected to the floppy disk port of the Macintosh 128 and 512. This port is connected to a chip called the IWM (Integrated Woz Machine), which does most of the work of decoding the information from the disk. So the floppy disk mechanism is pretty simple; its electronics don't do much but communicate the data to and from the disk-drive head.

And that information comes off the head serially — that is, one bit at a time — so I guess you could call the floppy disk a *serial device.* Since the original HD20 looks like a very big floppy-disk drive. to the Macintosh hardware, you could call it a serial device

THE HELP FOLDER

too. And the 128K ROMs in the Mac 512KE and Macintosh Plus can indeed start up from this serial device.

But when I said *serial* I meant *printer or modem port.* The people who designed the original MacBottom hard disk realized that the two serial-interface ports on the Macintosh could transfer information just about as fast as the floppy-disk port, and it was a lot easier to put a small microprocessor and serial-interface chip inside their hard-disk drive than to make it fool the Macintosh into thinking it was a large hard disk. And it's this kind of serial hard disk, the one that connects to the modem port, that doesn't automatically start up a Mac.

TIRED OF TELEVISION?

Q. I have a Mac SE and would like to know if it is possible to use a color television as a monitor. Will the television give me the benefits of a large screen monitor? Do I need a graphics card, and is color a possibility? Will it ruin my television? Where can I purchase cable extenders for both the keyboard and mouse?

THOMAS J. DANHO
ATTLEBORO, MASS.

A. Your second question is at the heart of the matter. Most of the functionality of a monitor is determined by the graphics circuitry inside the computer. The Macintosh SE has graphics circuitry that produces a black-and-white image 512 dots wide and 342 dots tall, and to get anything else — such as color or more resolution — requires additional circuitry. So color and large screen are possible only if you buy a graphics card, which can be more expensive than a monitor.

Unfortunately, even the video image produced by the built-in circuitry is too complex for the average television set. It's not interlaced like a television image is, so common Mac graphic elements like the thin lines in title bars will appear to jump up and down every thirtieth of a second. And the Mac's horizontal resolution is much higher than a color TV is equipped to handle, so text characters, thin lines, and patterns would be illegible.

MISSING FONTS? NO, MISSING KEYS

Q. I own a 512K Mac that has the Apple ROM upgrade. My Mac also has a 2-megabyte memory upgrade done by a local MacMemory dealer. This year I had MacMemory add a SCSI port in order to add a Jasmine hard-disk drive.

These two drives are identical.

But there are five differences.



Since the return of my machine, my Mac periodically loses its ability to "remember" fonts. I'll be in a program, any program from Dark Castle to Word 3.01, when the keyboard becomes nonresponsive or only types out blank squares or numbers. What's the story? If I restart my Mac, the fonts come back. Also, if I replace my System the problem doesn't come back as fast, but it always comes back.

Any suggestions?

RICHARD J. WIANECKI
LOS ALAMITOS, CALIF.

A. This one took a bit of figuring out, but the screen dump of Key Caps you supplied told me the whole story (see Figure 1).

First of all, your fonts are fine. You can see them in the appropriate menu bars. So there's nothing wrong with your fonts or System file.

What's wrong is your keyboard. Key Caps shows exactly what character will be typed when you press each key. And what it's showing is what you're getting: boxes and numbers, with the occasional funny symbol (the Apple, the check box from menus, the Command-key symbol, and the diamond).

Those characters are known as *control characters.* Their ASCII code is between 0 and 31, and they're generated by holding down the Control key on the keyboard.

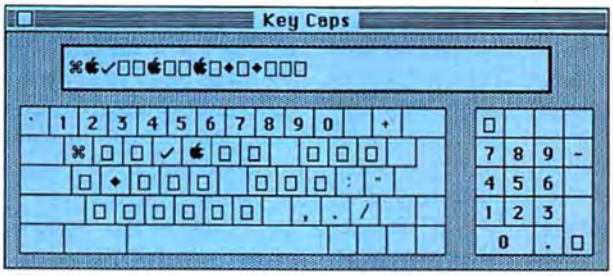


Figure 1: Key Caps is the key to unlocking the mystery of the locked Control key.

But your keyboard doesn't have a Control key.

Key Caps agrees. It shows the picture for the keyboard you have. And when a key is being pressed, it highlights it. But the diagram shows the Mac Plus keyboard, which has no Control key, and nothing's highlighted!

I can guess what's happening. The Mac 128K, 512K, and Plus keyboards have a *key-down, key up cycle.* When you press a key down, it sends a signal to the



The hard drive with the Apple label is a Quantum ProDrive™, shipped by Apple Computer.

The other is ours, also a Quantum ProDrive™, but with a Maxcess label.

Two identical drives.

Five big differences:

1. Maxcess is 50% less expensive. Compare buying a Mac II and adding Maxcess, to buying a Mac II stock with Apple's drive.
2. Our warranty is 2-years; Apple's is 90-days.
3. We have a toll-free technical support line; Apple has dealer support.
4. Maxcess can be mounted in the SE while keeping both floppy drives; Apple's drive mounts by replacing a floppy.
5. We add FWB's Hard Disk Partition™ and Hard Disk Deadbolt™ software; Apple uses system software common to all Macs.

Identical drives have never been so different.

Tech Spec: 19ms avg.access-time, 4-mb/sec. transfer-rate, 50,000 MTBF, auto-head park.

Maxcess-40 **$647**
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THE HELP FOLDER

Mac saying so; when you let the key up, it sends a different signal. That helps the Macintosh handle *rollover,* which lets you type more quickly by letting you press a second key before you've completely let up on the first. And it lets the Mac control things like the keyboard repeat rate.

But if the keyboard isn't working correctly, it can send a key-down message to the Mac and never send a key-up message. If this happens, the Mac will think the key is *still* being held down.

For some strange reason, your keyboard is occasionally sending a key-down message for the Control key (a key that's not really on the keyboard) and never sending a key-up message. The Mac quite happily assumes that you really mean to continue to hold the Control key down, so all it types is Control characters — which, as you've noticed, are not very versatile.

The solution is to get your keyboard repaired or replaced (see "Chairman of the Keyboard," June '88, for some do-it-yourself tips). Whenever this problem occurs, a temporary fix is to disconnect and reconnect your keyboard. That'll reset the keyboard, causing it and the Mac both to forget that the nonexistent Control key was ever mistakenly pressed down.

SIMM CHIPS REVISITED

Q. I was surprised to read the "With or Without" item in your October '88 column, in which you concluded, "the chips that Apple builds into the Plus and SE cannot be popped out and put into a Mac II."

Our law firm switched to Macintoshes last spring. We bought a Mac II for the word-processing center in each office, plus a few SEs. The SEs each received a 2-megabyte memory upgrade, which left a number of 256K SIMMs for which we had no use.

The dealer suggested that we could use the four of them to supplement the four 256-megabyte SIMMs in each Macintosh II and create a 2-meg computer.

So now our Mac IIs are running fine, using the memory chips Apple installed and those we swapped from our SEs. Is something wrong?
JACKSON S. WHITE, JR.
ABINGDON, VA.

A. If it's working, then nothing's wrong, except for my mistake. Macintosh SEs have always been shipped with 120-nanosecond SIMMs, which are appropriate for use in any Macintosh. Only the Macintosh Plus was originally shipped to customers with 150-nanosecond SIMMs,

Picture Permanent.



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If you're looking for an easy-to-use color printer that delivers fast, high quality color output, with full Apple Macintosh II compatibility, look at the G330-70 from Mitsubishi Electronics.

A built-in video interface enables the G330-70 to create a permanent copy on glossy paper or transparency film of any image viewed on your computer monitor.

With 150 dots per inch resolution, the G330-70 is ideally suited for presentation graphics, paint-type graphic art and PC CAD. It operates smoothly in several PC environments, including the Apple Macintosh II, IBM® PC/XT/A and compatibles, or IBM PS/2.™ The G330-70 can print the screen displays from popular graphics boards, including Mac II, CGA, EGA and VGA.

For fast, bold, brilliant color output directly from your monitor, specify th Mitsubishi® G330-70. At a suggested retail price of $5900, the G330-70 offers t most convenient method for high quality color output.

For product information or nearest authorized Mitsubish Electronics sales representatives, please call 1-800-556-1234, ext. 54R. In California, call 1-800-441-2345, ext. 54R. Mitsubi Electronics America, Inc., Computer Peripherals Division, 991 Knox Street, Torrance, CA 90502, (213) 217-5732.

The G330-70 color thermal transfer printer produces a full-color 8½" x 11" page or transparency in about 80 seconds.

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MITSUBISHI ELECTRONIC

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which may be used in a Mac Plus or SE but not in a II. When Apple shipped the SE and II, the Plus was given 120-nanosecond parts as well. So unless you have an older-than-January-1987 Macintosh Plus, you can use any Apple SIMM in any Macintosh.

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AREN'T 30 MEGS ENOUGH?

Q. I have a Mac SE with a 30-megabyte hard drive. If I try to run Microsoft Word and PageMaker under MultiFinder, I get a "not enough memory" message. Why is this happening and what can I do to fix it?

I'd like to have Microsoft Word, Microsoft Works, possibly Microsoft Excel, possibly QuarkXPress, and PageMaker all switching under MultiFinder. I thought I'd have no problem with 30 megs of memory. What can I do to use the capabilities of MultiFinder on my computer?

MICHAEL MARTINO
WINDSOR, CONN.

A. There's an important difference between System memory and disk memory. System memory is contained in chips called RAMs or DRAMs (dynamic random access memory). RAM is fast — its speed is measured in nanoseconds (billionths of a second). But it's rather expensive and is available only in relatively small quantities: The basic unit is a SIMM (single in-line memory module) with either one-quarter or 1 megabyte of memory, and it loses its information when the power is turned off.

Disk memory, however, is cheaper, is available in larger quantities (up to 300 megabytes), and remembers what's stored after the power is turned off. But it's slower: Access time is measured in milliseconds (thousandths of a second).

So computers use the different kinds of memory for different things. System memory is used to store the current application and parts of the document you're working on, and disk memory is used to store documents you've saved or applications you may want to use later. When you open an application or document, the computer copies it from the disk memory into System memory, and uses the copy in the much faster System memory.

That's why you're running out of room. You have only 1 megabyte of System memory, even though you have 30 megabytes of disk memory. (Choose About the Finder from the Apple menu: It shows how much System memory you have

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total, and how much is in use at the moment by applications.) The applications you're using, especially PageMaker, are pretty big, so they use a lot of System memory (select the PageMaker icon in the Finder and choose Get Info... from the File menu to see how much memory PageMaker wants).

The only way to run more applications under MultiFinder is to install more System memory. Your Macintosh SE can hold up to 4 megabytes of System memory, which should handle PageMaker, Excel, and Word, maybe with Works thrown in. Adding more disk memory is like adding a luggage rack to a two-seater car: You can haul around more luggage, but it won't help you carry more passengers.

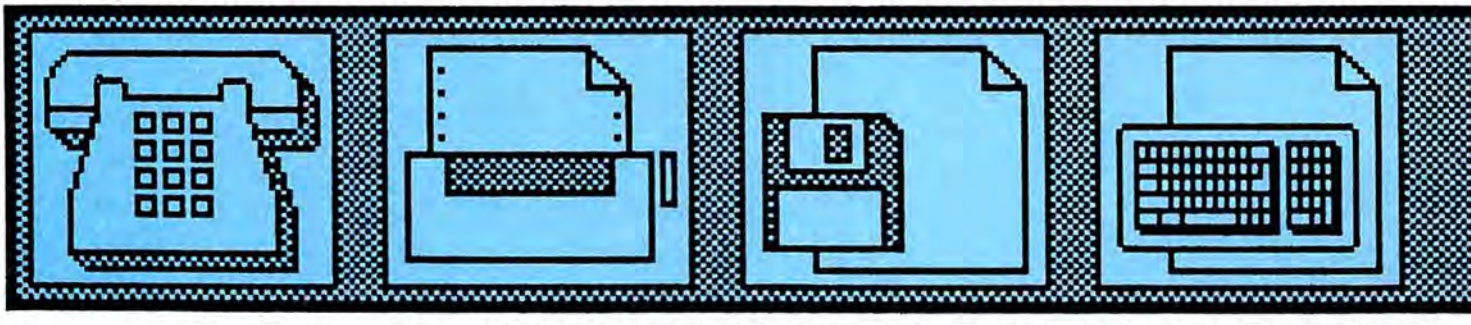
A technique called virtual memory lets a computer substitute disk memory for System memory. The Macintosh Resource Manager is a simple form of virtual memory. It brings fonts, dialog boxes, and desk accessories into System memory from disk memory automatically when they're needed. More complete implementations of virtual memory can help eliminate System memory restrictions and blur the distinction between System memory and disk memory. But to work well, virtual memory systems usually need what's called a *memory-management chip,* like the one that's optional on the Mac II and built into the Mac IIx. When your Mac has a memory-management chip and a virtual-memory operating system, your question will be valid. But for now, the answer is the standard one: Buy more RAM.

IBM PRINTING ON A LASERWRITER

Q. I have a Macintosh SE and a LaserWriter IINT, which work great together. But I also have an IBM Model 50Z that I would like to connect to the LaserWriter. I know that I can connect the IBM Model 50Z and LaserWriter IINT through a network like TOPS, but I would rather go the inexpensive route by using the serial port on the IBM and LaserWriter. I can make my own cables and I am looking for the correct pinout for the connectors.

None of my local dealers has any idea what the cables should be. Besides the cable, what should the DIP switches on the LaserWriter be set on? The LaserWriter is set to `XON/XOFF, N, 7, 1`; should these be changed? I thought `N, 8, 1` would be the common setting.

I am using PC Excel and Lotus, mostly. Can I use the



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Print command from MS-DOS?
STEVE WILLETT
ITHACA, N.Y.

A. First, the cable. The 25-pin port on the back of the LaserWriter IINT is a standard RS-232 connector (for aficionados, it's a Data Terminal Equipment, or DTE, device with a socket). To connect it to the IBM PC, use a standard serial-interface cable with a modem eliminator. Connect one end to the 25-pin connector on the Macintosh and the other end to the COM1 serial port on the IBM.

Once the cable is connected, there are three ways you can use the LaserWriter IINT or IINTX with an IBM PC (or clone). If you have PostScript applications, you can print with PostScript, with the full fonts and graphics ability of the LaserWriter; if you don't, you can use the Diablo 630 emulator built into the IINT.

Set DIP switch 1 to the Down position and switch 2 to the Up position to use Diablo 630 mode. Restart the LaserWriter IINT and check that the test page says *RS-232 9600 Baud.* (It'll be 7 bits; the IINT does not support Diablo emulation in 8-bit mode.) Start up the PC and, when you get the C> prompt, type

```
MODE
COM1:96,N,7,1,P
MODE LPT1:=COM1:
```

(You can put these commands in the AUTOEXEC.BAT file if you're going to be doing this often.)

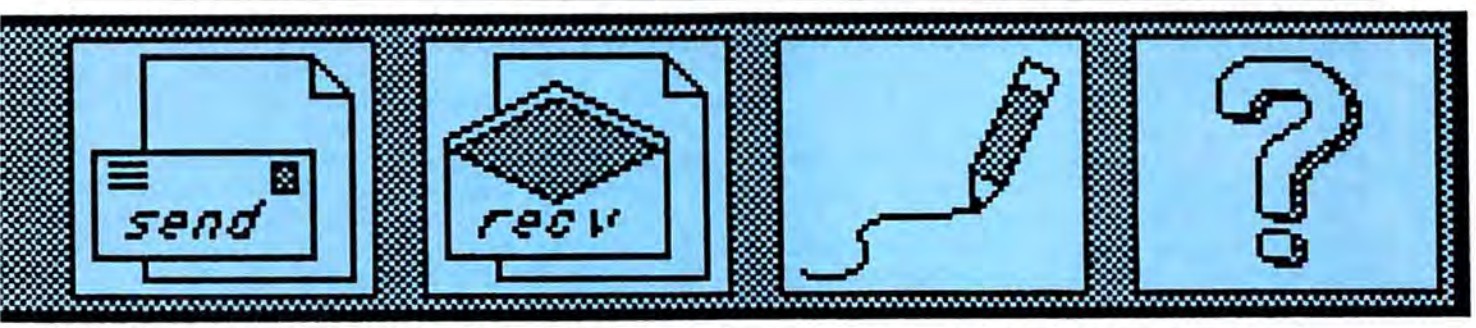
Run your PC application, and configure it to print to a Diablo 630 using XON/XOFF protocol. Then you should be able to print typewriter-quality documents or use the MS-DOS command `PRINT /D:COM1.`

There are a lot of other things you can do too. You can set ETX/ACK or DSR/DTR handshake, or use PostScript protocol, or if you had a LaserWriter IINTX, you could use Hewlett-Packard LaserJet+ emulation to get output better than the Diablo emulation (but not quite as good as PostScript).

There's not enough space in this column to describe the options and how to set them. Luckily, there's an excellent book on the topic: it's Appendix C of the *LaserWriter IINT/IINTX Owner's Guide,* which came with your printer. Remember to remove the shrinkwrap before you try to open it.

SAME VERSION, DIFFERENT SIZE?

Q. **I appreciate *MacUser* from time to time printing the table of System/Finder combinations and the recom-**



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mended use of them. Today I have been going through my disks, and I find that I have accumulated several different System/Finder/ImageWriter combinations. I'm concerned by my observation that systems associated with the same Finder do not always have the same number of kilobytes.

I have a lurking suspicion that perhaps some vendors may take the liberty of modifying some systems in order to make them more compatible with their software. If they do, would such systems be dangerous to use with other software?

ERNEST TAYLOR
WINSTON-SALEM, N.C.

A. Many software vendors (Apple included!) modify the System file on startup disks they ship with their products. But it's not as much a problem as you fear.

Because of the Resource Manager that's built into the Macintosh operating system, most Macintosh files (especially the System file) are modular: Instead of being one long string of code, they're broken into a few hundred "resources": fonts, desk accessories, dialog boxes, error messages, ROM patches, software packages, and so on.

The Resource Manager allows you to add or remove any of these components without damaging the file or compromising its integrity. So if you remove something you don't need, it should cause no problem.

Apple encourages software vendors to ship with the most recent standard System file. Actually, Apple now encourages vendors to ship with *no* System file, thus assuming that you, the buyer, already have the System file you want — the one that's configured for your machine and customized for your tastes.

But the System file is big. And as Apple adds more functionality to the System and makes it run on a larger number of machines, the System file gets bigger. Often it's so big that it doesn't fit on a floppy disk with an application!

So some software developers trim down the System file to make it fit. They usually just reduce the number of fonts and desk accessories; sometimes they remove other resources. If the application needs a megabyte of memory, many developers — just assuming that the customer will have a Mac Plus or later — remove those resources that are unique to the Mac 512K and 128.

If you have a hard disk, just use one System file on your hard disk. If you don't, use the System file that came with the application, and use the Installer to add printers or other additions to that disk. Your System files will all be different sizes and probably different versions, but the trouble of trying to reconcile all of them is probably not worth it.

. . . BUT WHAT IF IT DOESN'T FIT?

Q. **I have a Mac Plus with an 800K external drive. My problem: I want to update my System 3.2 and Finder 5.3 to 4.1 and 5.5, respectively. I use Works version 1.1 and Works Plus Spell version 1.1A as my main programs. Every time I try to install the new System, I get a message that says I don't have enough room on that disk.**

Do I have to buy a hard-disk drive just to update my System? If not, would you please explain how to do it?

A. J. BRITT
TAMPA, FLA.

A. As I noted above, sometimes the System gets so large that it doesn't fit on a disk with the application. It's best to buy a hard disk, especially if you're planning to run more applications in the future. But if you're satisfied with what your Mac does and still want to upgrade your System, here's how:

First, make sure the only things on the startup disk are the application and the System folder. Copy any documents onto separate disks, then drag them from the startup disk into the Trash.

Next, open up the System folder and make sure it doesn't have things you don't use. At the minimum, you need a System, Finder, printer driver, Scrapbook file, and Clipboard file. If there's anything else in there, copy it onto a backup disk, then drag it from the System Folder into the Trash.

Then start up the Font/DA Mover and use it to remove any fonts you don't use often (especially the larger sizes, which take up more disk space). If you don't use desk accessories like the Puzzle, remove them, too.

Now you can use the Installer to upgrade your System file.

WHERE DID THOSE NAMES COME FROM, ANYWAY?

Q. **Why is it called the Macintosh? And who was Lisa?**

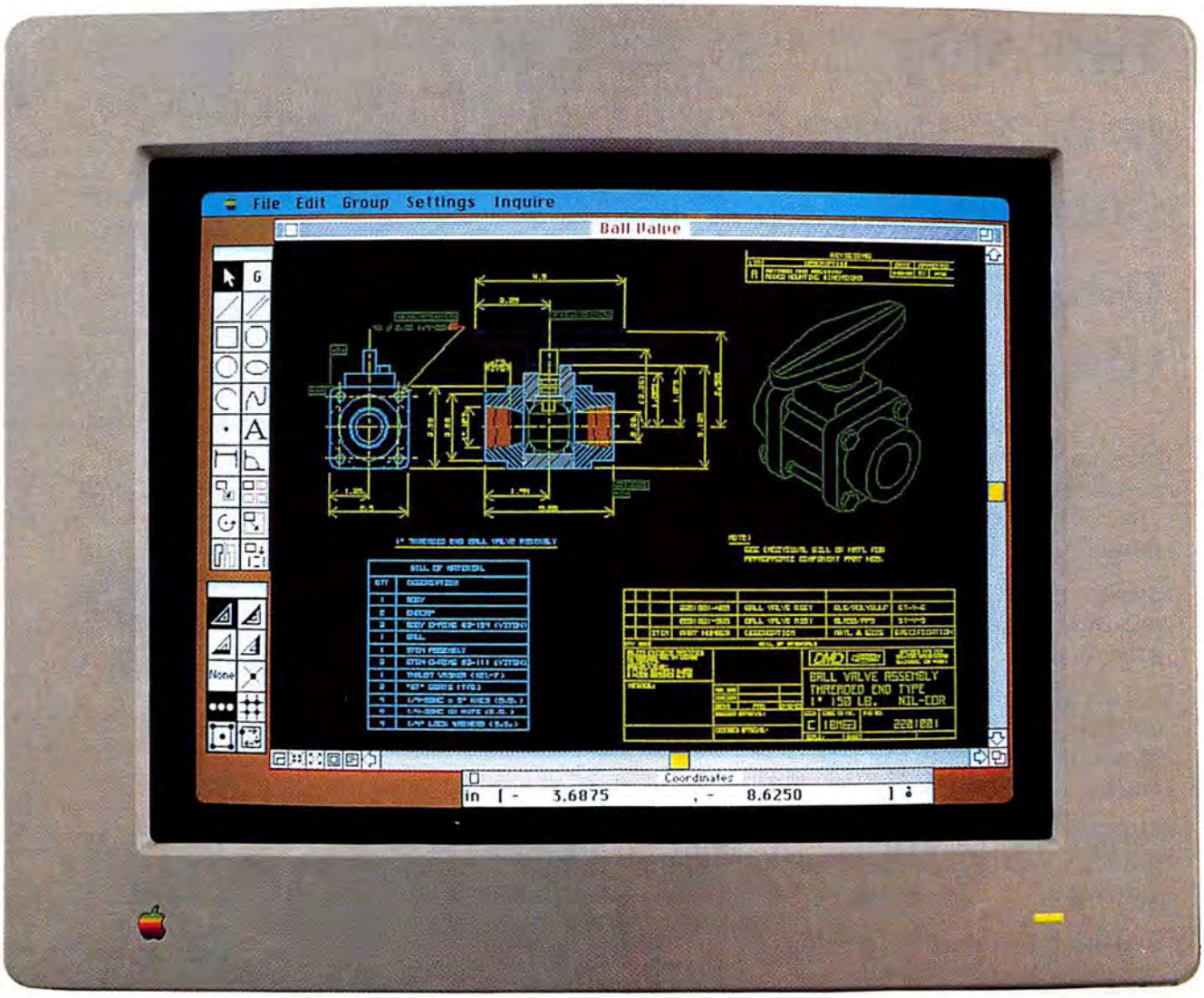
A. In the early days, there were two major themes for project names: feminine names and varieties of apples. For example, there were projects named Annie, Sara, and Lisa, as well as Pippin, Golden Delicious, and Macintosh.

Jef Raskin, originator of the Macintosh project, says he picked the name because it was his favorite kind of Apple. (And it was Jef who misspelled it — the apple is called *McIntosh* — but the name stuck anyway.) It was always expected that the names would change before the products shipped. The Lisa was to be called the Apple IV (following the I, II, and III).

But both project teams were fiercely loyal to their project names, and both names stuck. There was one attempt to make the names actually mean something. *Lisa* was supposed to be Locally Integrated Software Architecture, and at one point Macintosh was shortened to just Mac, for Mouse Activated Computer. These quickly degenerated into Let's Invent Silly Acronyms and Meaningless Acronym Computer.

So in the end it was just easier to ship them with the names we knew them by and teach people what the names meant. It seemed better than calling it the Zipchip ZX8000.

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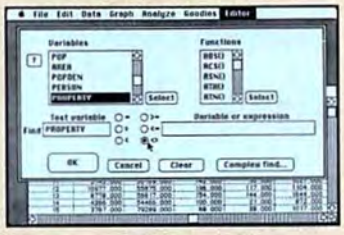
Statistics Basic statistics, frequencies, t-tests, post-hoc tests Multiway crosstabs with log-linear modeling, association coefficients, PRE statistics, asymptotic standard errors Nonparametric statistics (sign, Runs, Wilcoxon, Kruskal-Wallis, Friedman two-way ANOVA, Mann-Whitney U, Kolmogorov-Smirnov, Lilliefors, Kendall coefficient of concordance) Pairwise/listwise missing value correlation, SSCP, covariance, Spearman, Gamma, Kendall Tau, Euclidean distances Linear, polynomial, multiple, stepwise, weighted regression with extended diagnostics Multivariate general linear model includes multi-way ANOVA, ANOCOVA, MANOVA, repeated measures, canonical correlation Principal components, rotations, components scores Multidimensional scaling Multiple and canonical discriminant analysis, Bayesian classification Cluster analysis (hierarchical, single, average, complete, median, centroid linkage, k-means, cases, variables) Time series (smoothers, seasonal and nonseasonal ARIMA, ACF, PACF, CCF, transformations, Fourier analysis) Nonlinear estimation (nonlinear regression, maximum likelihood estimation, and more).

Data Management Spreadsheet data editor with row/column cut and paste Transformations executed via menus and dialog boxes Import/export text files Missing data, arrays, character variables Character, numeric, and nested sorts Subgroup processing with SELECT and BY Value labels and RECODE statements Unlimited cases.

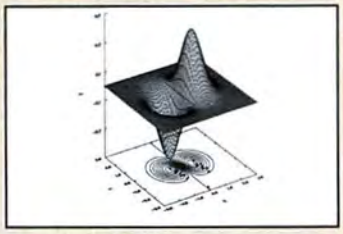
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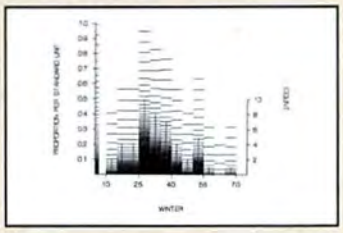
Mac screens



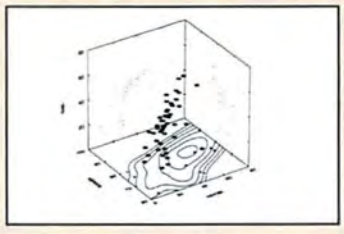


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MacUSER LABS BRIEFS:

Soft PC

By John Rizzo

Macintoshes are showing up on desktops everywhere. Wouldn't it be nice to get your PC to show up on your Mac desktop? And would you sacrifice a little DOS speed for less than half the cost of a good PC clone? If so, read on, for this month we take a close look at SoftPC from Insignia Solutions of San Francisco, a program that lets you run DOS in a window on your Mac. Previous solutions, such as AST Research's Mac286 for the Mac II and PerfecTEK's Mac+PC SE were hardware solutions, which actually put Intel processors in the Mac. The hardware solutions are certainly faster, but they don't match SoftPC for ease of use and low price.

Features

SoftPC emulates the Intel 8088 processor found in the IBM PC XT. The program has been available for several years on workstations like Sun Microsystems', MIPS, and Tektronix and has been ported to the Mac from the Sun version. Software emulation of DOS is common in UNIX environments, where the speed difference between software and hardware emulation is getting small — because of fast reduced instruction set computer (RISC) processors.

SoftPC is big: It requires at least 2 megabytes of RAM and a 32-bit Motorola microprocessor — the 68020 or 68030 found in the Mac II, IIx, or some accelerator boards for the SE. Two versions come with the package — one that takes up 2.4 megabytes of RAM for 4-megabyte machines, and one that uses 1.7 megabytes for 2-megabyte Macs. The standard version is about 10 to 15 percent faster than the small version.

SoftPC is easily installed in two or three minutes by copying software to a Mac's hard disk. When you double-click on the SoftPC icon, MS-DOS and GW-Basic are loaded in a window that looks and acts exactly like a DOS screen down to every detail, including a recording of the sound a PC floppy-disk drive makes upon boot-up. You can then type in normal DOS commands. SoftPC also emulates the Microsoft Mouse Bus so the Mac mouse can be used in DOS applications that employ the Microsoft mouse. But your Mac sees SoftPC as an ordinary application, so you have access to your normal Mac DAs.

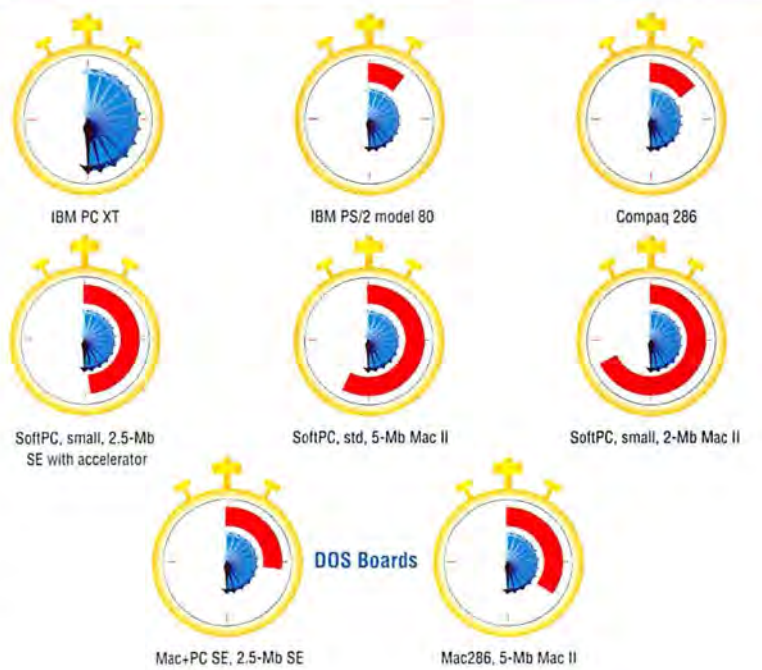
We looked at SoftPC version 1.2, which supports CGA 16-color display. Most PC software is supported, including terminate-and-stay-resident software like Borland's Sidekick. Why would one want to use Sidekick when the Mac's DAs are available? Because SoftPC can be used by any PC-literate user with virtually no Mac training.

SoftPC is MultiFinder compatible, so a DOS task needn't take over your entire Mac. The on-screen DOS and Mac windows are handy for exporting data from DOS to Mac-compatible programs such as 1-2-3, Excel, PageMaker, and Word. You can also use the Clipboard to copy text from a DOS program using the Mac's mouse and the Copy command. DOS does not allow Mac-to-DOS transfers via the Clipboard. However, a Mac file saved in a format that DOS can read can be opened from within SoftPC.

Disk drives available to the DOS window are designated A:, C:, D:, and E: through a pull-down menu. Drive A: is reserved for the Apple PC 5.25 Drive, a 360K floppy-disk drive that you'll be able to use only with a Mac II. SoftPC requires a 32-bit accelerator to occupy the SE's expansion slot, which the drive also needs. Fortunately, Drive A: can also be the drive A: of an actual IBM PC compatible connected with a serial cable, which is accomplished using the SlavePC utility included in the SoftPC package.

DaynaFile, a DOS floppy-disk drive connected to the Mac with a SCSI cable, can be accessed as drive E:. This is handy since DaynaFile is a SCSI device offering a variety of floppy-disk sizes and

Clocking the DOS Alternatives



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Test Results

	SoftPC, small 2-Mb Mac II	SoftPC, std. 5-Mb Mac II	SoftPC, std. 2.5-Mb SE	Mac286 5-Mb Mac II	Mac+PC SE 2.5-Mb SE	IBM PC XT	IBM PS/2	Compaq 286
128K NOP (no operation) loop	1.43	1.13	1.22	0.44	0.67	1.00	0.22	0.30
String sort and move	1.25	1.16	0.75	0.24	0.53	1.00	0.13	0.18
Prime number sieve	1.43	1.25	0.78	0.26	0.60	1.00	0.12	0.19
8086/8088 instruction set (random mix)	1.11	1.02	0.79	0.25	0.58	1.00	0.15	0.19
Floating-point test (no 8087)	2.00	1.82	1.38	0.21	0.50	1.00	0.10	0.15
RAM test (conventional read)	0.77	0.72	0.46	0.18	0.44	1.00	0.10	0.14
Video display tests — Teletype refresh	0.83	0.79	0.49	2.08	0.40	1.00	0.08	0.32

Test result times are normalized to the speed of an IBM PC XT (1.0). Values less than 1 are faster than the XT; those greater than 1 are slower.

densities, and it is more flexible than Apple's drive. Unfortunately, some copy-protected PC software requires drive A: and therefore won't work with a DaynaFile. In general, drive E: is designated as a folder or volume on the Macintosh desktop. Drive E: can be on a SCSI device, a Mac floppy, or a remote volume such as AppleShare or TOPS.

Drives C: and D: are virtual drives on the Mac hard disk that can be created in sizes from 1 to 30 megabytes. They are represented on the Mac as icons in a designated folder. The drives' contents can be accessed only from the DOS window; you can't open them up in the Finder to see what files are in them as you can with a folder designated drive E:. As in normal PC operation, drive C: is the default boot-up drive unless there is a floppy disk in drive A:.

Benchmarks

We ran PC Magazine Labs' standard suite of PC processor tests on both versions of SoftPC in a Mac II with 2 megabytes of RAM and again with 5 megabytes. We also tested the small version in a 2.5-megabyte SE with a Radius 25 Accelerator, which uses a 25-megahertz 68020. We ran the same tests on AST Research's Mac286 DOS card on a Mac II and PerfecTEK's Mac+PC SE. For comparison, we also tested the IBM compatibles: the IBM PC XT, the Compaq 286, and the IBM PS/2 model 80.

The first four tests measure the speed of the processor routines, or in SoftPC's case, the emulation. The floating-point test measures the speed of floating-point math calculations without the use of a floating-point chip. The next test measures RAM access time, and the last measures the time it takes to write and rewrite characters to the screen.

On the average, the standard SoftPC was about 13 percent slower than an XT, 42 percent slower than AST research's card, and more than five times slower than a PS/2 model 80. However, the SE with the 25-megahertz accelerator helped the standard version a great deal, averaging about 16 percent faster than the XT and about 26 percent faster than the standard version on a Mac II. On a Mac II, the small SoftPC version averaged about 10.5 percent slower than the standard version.

Conclusion

Running DOS on a Mac isn't the only way to solve the Mac-PC connectivity problem. For instance, you can use programs on each side that can read each other's files, like Excel and 1-2-3. Many vendors offer compatible Mac and DOS versions of their programs, such as Aldus PageMaker, Microsoft Word, and a recently announced PC version of Adobe Illustrator. You can fit your Mac or PC with a floppy-disk drive that reads the foreign format, you can use a Mac IIx, which comes with a drive that reads DOS, or you can connect your computers using serial or network solutions. For noncompatible files, you can use file translators such as MacLink Plus, Apple File Exchange, and QuickShare software.

Unfortunately, these solutions might not be the most efficient if you frequently use DOS applications and data. Running DOS on a Mac is a good solution if you need to run multiple DOS applications or if you have personnel you don't want to train on a Mac and translation hardware and software.

Putting DOS on your Mac by adding hardware has one advantage — speed. SoftPC on an accelerated SE can give you performance a little better than that of a standard PC, but the Mac boards are almost twice as fast. If speed is important to you, or if your applications are numerically intensive, as very large databases are, a DOS board might be a better alternative.

But SoftPC has several advantages over installing a PC board in your Mac. First, SoftPC is easier to use and install than hardware, requiring a minimum of training for non-Mac users. Second, the ability to use any Mac disk or a slave PC is very useful. The AST card cannot use the DaynaFile floppy-disk drive, which is superior to Apple's DOS drive. SoftPC's access to drives is more elegant and flexible than either of the boards'.

A big advantage of SoftPC is its $595 price tag. The PerfecTEK SE board costs $1,195, and the AST board costs $1,599 and requires you to own an Apple PC 5.25 Drive. But remember, SoftPC requires a 68020 or 68030 processor and 2 to 4 megabytes of RAM. Your savings over a hardware solution will drastically diminish if you have to buy RAM — but then, extra memory will also help you with your Mac applications.

If speed is your primary concern, MacUser Labs suggests you go with a hardware solution. If not, SoftPC's drive and user interface make it the most elegant, flexible solution for putting DOS on your Mac. ■

D Basic Bibliography

With bibliographic database programs like Pro-Cite and EndNote, you can organize all your reference material in short order. And it's actually a painless process.

Disorganization is a trait inherent in most writers. Sure. Try convincing yourself of this while sifting through piles of papers and various scraps looking for material to use in an article. Quite a painstaking process, no? If you own a Mac, you can make situations like this a little easier with one of the sophisticated bibliographic database programs now available.

What's the difference between bibliographic databases and the more general-purpose packages on the market? Different types of reference material require different categories of data fields not found in the general-purpose packages. For example, a reference library could include journal articles, book chapters, and speakers' notes. Each of these reference types has different field requirements (e.g., volume numbers are needed for journals but not for books, while locations are needed for speeches but not for journals).

Moreover, the stylistic requirements for a formatted bibliography will differ dramatically depending on where you intend to publish it. For instance, some journals require that the year of publication appear in parentheses after the author's name, while others require the year at the end of the reference without parentheses. Trying



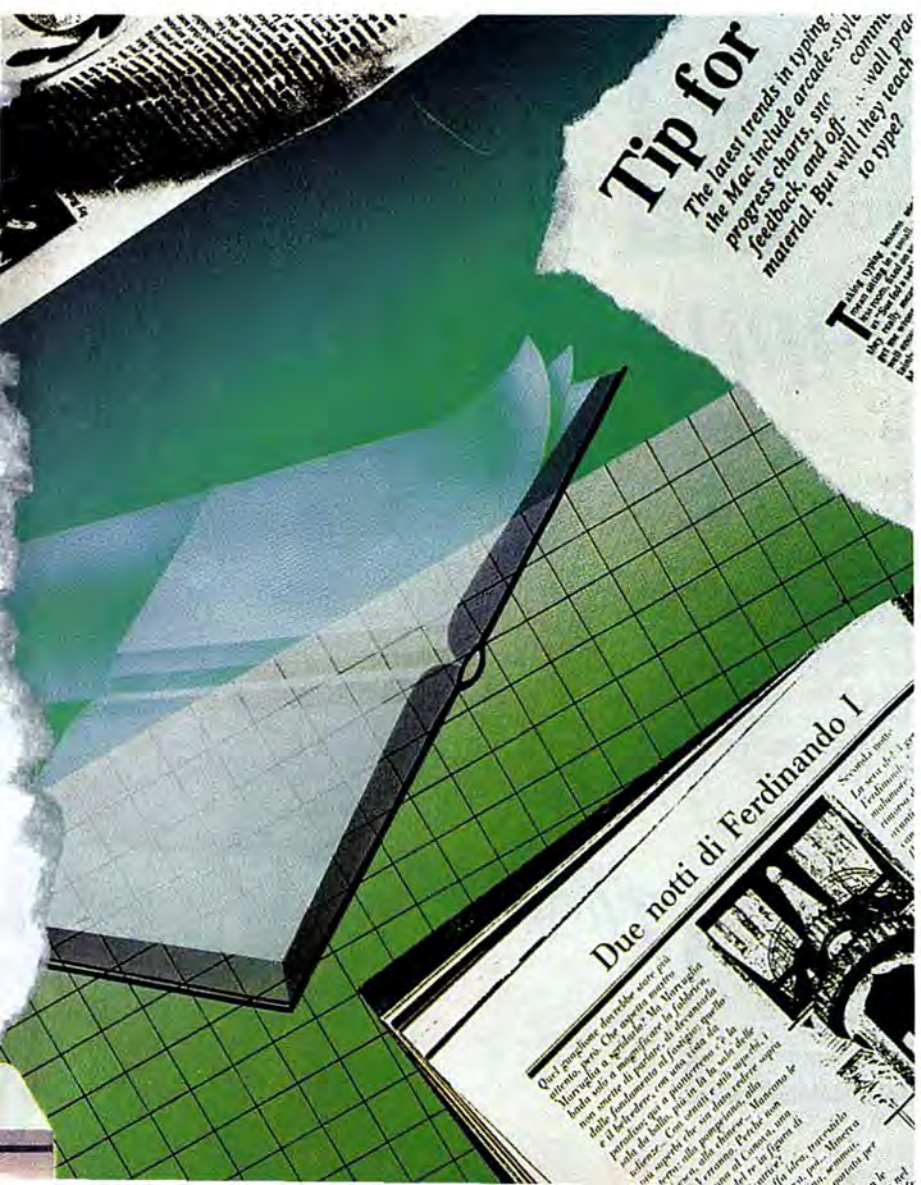
BY TED LANDAU

to accommodate this variability with an ordinary database is a sure road to frustration and disappointment. Hence the need for bibliographic database programs such as Pro-Cite (from Personal Bibliographic Software) and EndNote (from Niles and Associates), two of the best packages on the market.

WHAT'S THE USE?

Other than writers, who else has a use for these programs? Doctors, lawyers, and professors are constantly having to put together information from their own libraries. A comprehensive listing of the articles in their journals, subject matter in their books, and topics discussed in lectures is a great time saver for these professionals. Even students, particularly those at the graduate level, could use bibliographic databases to keep track of their research for dissertations and other research papers.

Pro-Cite has 45 available fields, offering a range that includes authors, titles, dates, index terms, and abstracts, each variable in length.



THE POWER OF PRO-CITE

In its first life, Pro-Cite actually was Professional Bibliographic System, or PBS (see review, February '87). Compared with PBS, Pro-Cite has (among other enhancements) much-improved flexibility for formatting output as well as more sophisticated search and sort procedures. The result is a powerful program that represents the latest in bibliographic database management.

As with other database programs, you enter records individually, viewing one screen at a time (see Figure 1a). The click of a button allows you to edit a record, select a record, or move to another record. The column of abbreviations along the left side of the display represents field names. Pro-Cite has 45 available fields, offering a range that includes authors, titles, dates, index terms, and abstracts, each variable in length. These fields are relational, too — you can pull in authors' names and journal records from other *authority lists.* This not only saves you time in re-entering data, but also it reduces the chances of error.

Various subsets of the fields combine to create different reference types — Pro-Cite calls them *workforms.* Pro-Cite allows you to select from among 22 predesigned workforms, which can be as esoteric as music scores, motion pictures, and maps (see Figure 1b). Of course, each record in a data file may be assigned individually to any of the available workforms. This simplifies combining such different workforms as journal articles and musical scores into the same database. And if your needs are more specialized, you can even design your own custom workforms.

Another problem you'll face in creating a bibliography is having to adhere to a particular style. Pro-Cite accommodates different bibliographic styles through its use of *punctuation files.* These are mini-programs (using Pro-Cite's own built-in language) that

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Font size range	4-127 pts.	7-24 pts.	7-72 pts.	2-127 pts.
Maximum recommended document size (in pages)	Over 2,000	240	50	500
Number of open documents	Unlimited *	1	30	30
Mail merge	**Yes**	No	No	Yes
Number of editable, on-screen columns (WYSIWYG)	4	1	1	1
On-screen auto-numbering footnotes	Yes	No	No	No
Automatic repagination	Yes	Yes	No	No
Graphics in same line as text	Yes	No	Yes	Yes
Multiple headers and footers	Yes	No	No	Yes
Extensive Undo	Yes	No	No	No
Variable line spacing (in points)	Yes	No	No	Yes
Selective font, size, style, and ruler changes	Yes	No	No	Yes
MacUser Magazine's Best New Word Processor	**Yes**	No	No	No
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Spell Check document	6.3 *sec*	2 *min* 34.0 *sec*	2 *min* 2.3 *sec*	1 *min* 48.0 *sec*
Copy & Paste large area	6.8 *sec*	1 *min* 0.9 *sec*	12.4 *sec*	12.3 *sec*
Change font size of document	10.7 *sec*	50.2 *sec*	17.6 *sec*	16.2 *sec*
Change font of document	10.8 *sec*	37.1 *sec*	14.1 *sec*	15.2 *sec*
'Save As' a 12-page document	3.6 *sec*	9.4 *sec*	20.3 *sec*	19.6 *sec*
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llow you to specify the style, punctuation, and ordering of output fields down to such details as whether authors' last names come first or last, and whether initials or full first names are to be used. Each workform has its own punctuation file, and these files are grouped together in sets according to how they relate to a particular publication's style. Pro-Cite comes with a collection of already created sets of punctuation files for common styles, such as that of the Modern Language Association (MLA) and the American Psychological Association (APA). You simply select the style you wish to use, and all output will be formatted to match the requirements of that style. If your needs require it, you can edit existing punctuation files or even create your own, though (thankfully) this will not be necessary for most users (see Figure 2).

EndNote is designed to work in conjunction with a word processor.

Pro-Cite's power can be found wherever you look for it. It allows for searches on almost any imaginable set of criteria (see Figure 3). It has similarly strong sorting capabilities, allowing for simultaneous multiple sorts on separate fields. Different fonts and font styles can be combined as desired, and the formatted output will appear on the screen for previewing prior to printing. Even this previewed output can be directly edited, virtually eliminating the need for final touch-up in a word processor (see Figure 4).

Finally, Pro-Cite has a convenient feature that I almost overlooked in my initial testing of the program: the ability to scan a text file and replace all bibliographic references (e.g., in the form of: Johnson, 1984) with sequentially increasing numbers and then to create the bibliography with matching numbers. Nice, huh? This is an immense time saver when writing for a publication that requires this style.

THE EXTRA CLUNKY VARIETY

Despite its power (or perhaps because of it), Pro-Cite often appears unnecessarily complex, nonintuitive, and just plain difficult to use. For example, Pro-Cite has the useful option of allowing journal titles to be listed in full or abbreviated. But to take advantage of this option requires understanding an awkward procedure that involves authority lists, surrounding titles with special brackets, and selecting an obscure button in the Configure dialog box. Similarly, to sort the records in a database, you can't begin with the seemingly obvious step of selecting the Sort command from the Database menu. Instead, you must first access the Select Field Options dialog box to set the parameters of the sort, then

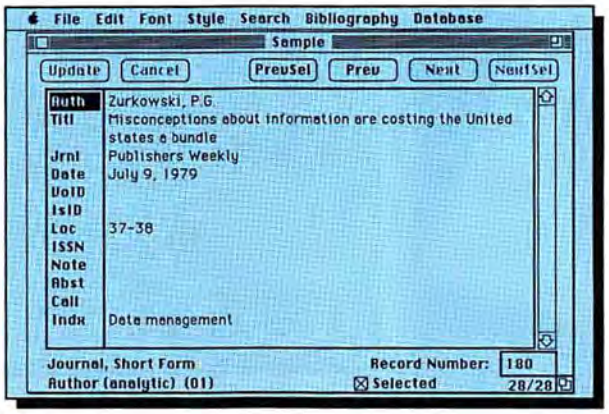


Figure 1a: The main display screen of Pro-Cite here shows an individual record. The current workform is "Journal, short form" and the current field that is highlighted is "Author (analytic) (01)." Twenty-two workforms and 45 fields are built in.

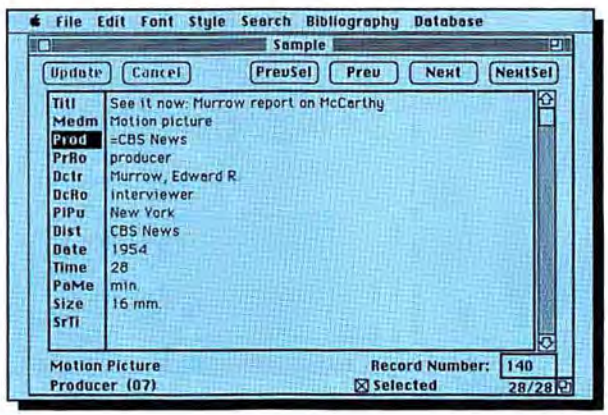


Figure 1b: In the main display screen of Pro-Cite, this workform is for a motion picture. Note how the field list has changed to match what is needed for the new workform.

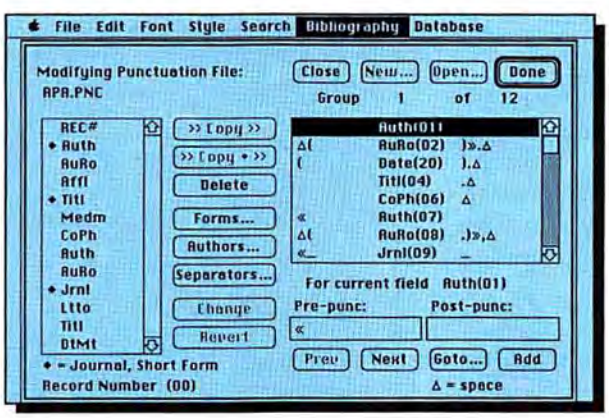


Figure 2: Here's the dialog box for constructing punctuation files in Pro-Cite. These punctuation files determine the specifics of formatting when creating a bibliography.

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AVERY

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choose from descending and ascending sort order in the Formatting Options dialog box. Then (finally) you are ready to select Sort.

Another problem is that Pro-Cite is anything but a speed demon when it comes to preparing bibliographies. If your reference list is a long one, consider a coffee break while you're waiting.

Although Pro-Cite's documentation is thorough, its style is unnecessari ponderous (one should wonder, wit 200 pages to the basic manual and 4(pages of appendices), and screen sho are sparse. This only adds to the gene al impression that the program is diff cult to use; on-screen help is also limit ed. One other shortcoming of Pro-Cit is that it doesn't work as closely wit word processors as EndNote.

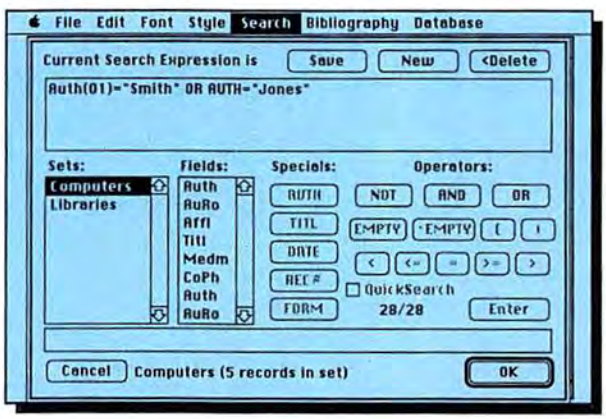


Figure 3: Pro-Cite uses this dialog box to set up search expression for selecting specified records. The records selected as the result of any search can be saved as a set.

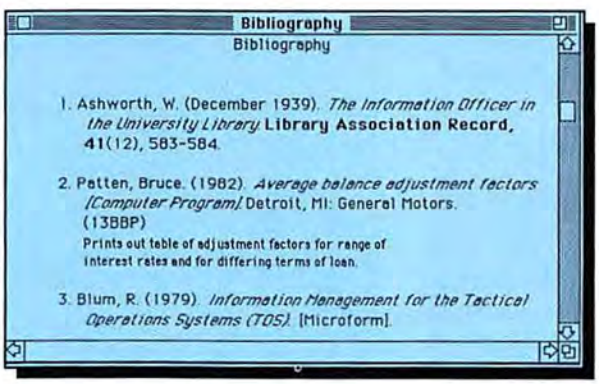


Figure 4: Here's an example of a formatted bibliographic output file created by Pro-Cite. Various formatting options were determined by Pro-Cite's formatting commands and punctuation files, as well as by direct editing of th output file itself.

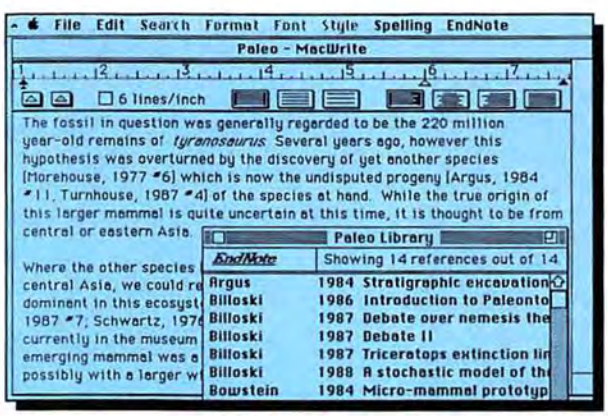


Figure 5: EndNote can work as a DA — you c use it in combination wi many word processors, including MacWrite. The citations shown in squa brackets within the MacWrite document were pasted there from EndNote. EndNote can now scan these citatio format them, and crea the matching bibliography at the en the document.

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EVERYTHING GOES GREAT WITH ENDNOTE

EndNote's approach to bibliographic database management is substantially different from Pro-Cite's. EndNote's primary function is to place in-text citations within a manuscript and create bibliographies derived from these citations. At this task, it far exceeds Pro-Cite.

EndNote is designed to work in conjunction with a word processor. As such, it works best when running under MultiFinder, with your word processor and EndNote open simultaneously. If you do not have enough RAM to do this, a desk accessory version of EndNote is included that has most of the features of the full application. EndNote is compatible with MacWrite, Word, WriteNow, and interchange formats (as well as, of course, text-only files).

Whenever you wish to cite a reference in your word-processing document, you open the appropriate EndNote library (using either the DA or the application), select the appropriate reference, and paste it in to your document.

Initially, what will appear in your document is a special version of the pasted citation that is recognizable by EndNote (see Figure 5). When you are finished pasting in all your citations, you can then transfer to the EndNote application, open the same document you were just using, select the desired bibliographic style from the Style menu, and then select Format from the Paper menu (see Figure 6). When you return to your original document, you will find two significant changes: All in-text citations have been changed to reflect the format of

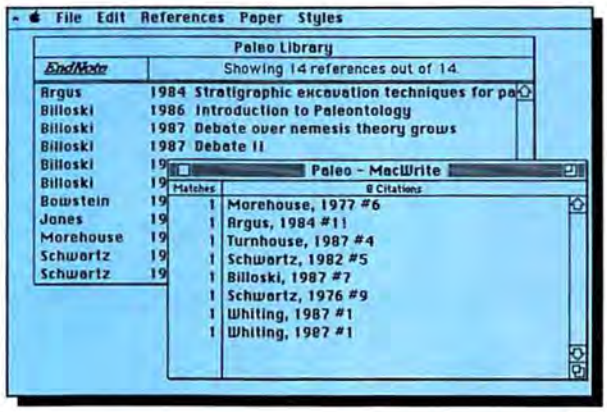


Figure 6: In the EndNote application, the MacWrite paper from Figure 5 is now opened and ready to be scanned. The window in the foreground identifies the references cited in the MacWrite document that are contained in the active reference library.

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HOW THE NOTES STACK UP

EndNote and Pro-Cite share the ability to deal with different reference types (workforms) and bibliographic styles (punctuation files). EndNote comes with more than a dozen predefined reference types. In addition, you can design new ones with the help of a spreadsheet-like dialog box, which adds a new column for each of the appropriate fields. All fields can be given new names if desired (see Figure 7).

Similarly, EndNote can handle various bibliographic styles. Rather than using the programming language approach of Pro-Cite, you simply type in a formatted "dummy" version for each reference type. The dummy version then serves as the template for formatting that particular reference type.

Unlike Pro-Cite, EndNote also allows you to format the appearance of in-text citations, since these, too, may vary depending upon the particular demands of a given publication. EndNote provides a relatively full range of style options, including different fonts, and it gives you control over the ordering and formatting of authors' names.

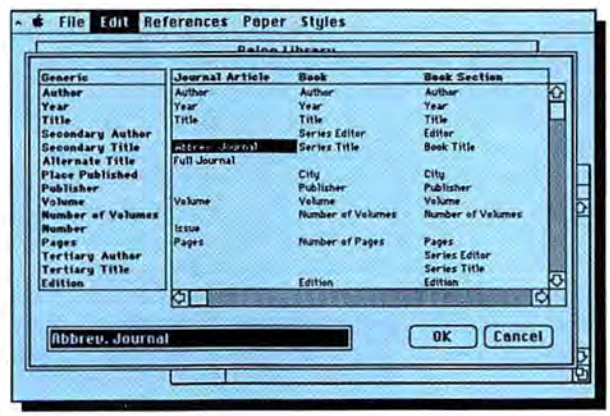
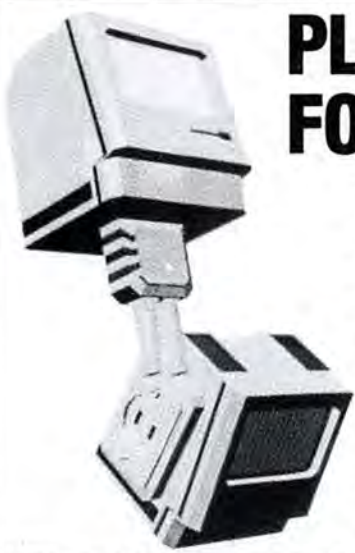


Figure 7: Through this EndNote dialog box, you can create a new reference type or edit an existing one. A subset of the fields listed on the left (in boldface) is selected to form each particular reference type.



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It even allows for superscripting and subscripting (which Pro-Cite does not).

Finally, EndNote is a paragon of simplicity. Its manual is clear, well-written, relatively complete, and contained within 130 pages (a few minor features, apparently added at the last minute, are not mentioned in the manual). Having lumbered through Pro-Cite's documentation, I was impressed with EndNote's straightforward technique for handling the complexities of varying reference types and bibliographic styles. Like all good Macintosh software, it impresses you not only with what it can do but with how easily it can do it.

DECISIONS, DECISIONS

Pro-Cite and EndNote share many features. Both can produce bibliographies formatted according to any number of stylistic requirements. Users of either program can easily create differently styled bibliographies from a single reference list. So, assuming you are in the market to buy one of these programs, which should it be: Pro-Cite or EndNote? This depends upon your needs.

If your needs are primarily to maintain a bibliographic reference library, then Pro-Cite is the better choice. EndNote has some serious limitations in this area. You cannot print out a formatted bibliography from within EndNote — it only produces bibliographies from citations appearing in a word-processing document. For example, if you simply wanted to select all 1987 references from your library and print them out, EndNote could not easily do it. EndNote also has much more limited search capabilities than Pro-Cite. For example, it does not have full Boolean search capabilities (e.g., it uses Boolean OR but not AND), it cannot search on selected fields (except for author and year), and it will not search for an exact match. Also, EndNote does not easily allow you to scan individual records in their full editable form.

Pro-Cite has all of these features and more, including superior sorting capabilities, the ability to create bibliographic indexes, and complete Boolean search functions on any field or combination of fields. It can also save "results sets" from searches for future retrieval. Pro-Cite's authority lists and its ability to preview and directly edit a bibliography are two more of its many conveniences. Basically, Pro-Cite has more muscle than EndNote in most areas of database management.

If you imagine using your database primarily to create bibliographies within manuscripts, however, then EndNote is the clear winner. Pro-Cite can only work with in-text citations from text-only files, while EndNote handles the files of three major word processors in addition to text-only files. EndNote also allows you to paste citations directly into a word-processing document. It then creates and formats both the in-text citations and the matching bibliography according to any designated bibliographic style. With Pro-Cite, you must type in the original citations yourself, and even then Pro-Cite can only format them to sequential numbers.

If, after all these considerations, you are still undecided as to which program is better suited to your needs, I would go with EndNote. It is a more elegantly designed program, simpler to use, and less expensive. But whichever one you choose, you will soon be wondering how you ever managed your bibliographic tasks without it.

TED LANDAU IS A PROFESSOR OF PSYCHOLOGY AT OAKLAND UNIVERSITY IN ROCHESTER, MICH. WHEN NOT TEACHING OR DOING RESEARCH, HE IS EITHER USING HIS MACINTOSH OR WRITING ABOUT IT.

Bibliographies on a Budget

If your needs or your budget are especially modest, two desirable alternatives may be Publish or Perish (from Park Row Software) or Bookends Mac (from Sensible Software). Publish or Perish is simple, straightforward, easy to use, and costs only $29.95 (see Figure A). The entire documentation is less than a dozen pages (and is mostly duplicated by on-screen help). The program itself is only 65K in size and runs on any Macintosh. It allows for keyword indexing and provides an optional Notes window for the entry of more lengthy text (such as an abstract). On the plus side, it can format output based on different bibliographic styles. However, only two predefined styles are available (MLA and APA), although you can design your own custom formats. Unfortunately, with only the single generic template available, Publish or Perish has no ability to handle different reference types. Its searching and sorting functions are similarly limited, and printed output is restricted to a single font and style. Also, you can only save your work as a text-only file (which cannot be previewed from within Publish or Perish). This means that final touch-up will require extensive use of a word processor. Still, this program is adequate for simple cataloging, where formatted output is not important.

If your database management needs exceed the capabilities of Publish or Perish, you might want to consider the middle-level option of Bookends Mac ($99.95), an application designed in HyperCard (see Figure B). Notably, it can handle different

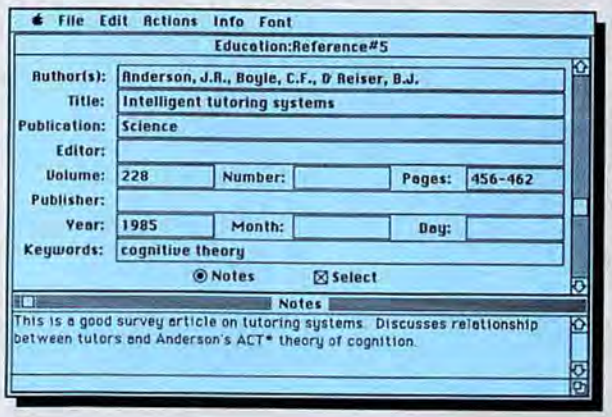


Figure A: With Publish or Perish, what you see is all you get. The program has no ability to vary reference types, though it can handle different bibliographic styles (e.g., APA versus MLA) to some extent. If formatted output is not important, this program may be adequate for your needs.

MACUSER RATING

Pro-Cite ½

Follows Mac Interface	■ ■ ■ ■ □
Printed Documentation	■ ■ ■ □ □
On-Screen Help	■ ■ ■ □ □
Performance	■ ■ ■ ■ □
Support	■ ■ ■ ■ □
Consumer Value	■ ■ ■ □ □

Comments: Complete database management for bibliographies. **Best Feature:** Almost unlimited flexibility in the formatting of bibliographies. Full-featured search and sort capabilities. **Worst Feature:** Overly complicated and nonintuitive use of menu bar and dialog boxes. **List Price:** $395. Published by Personal Bibliographic Software, Inc., P.O. Box 4520, Ann Arbor, MI 48106; (313) 996-1580. Version 1.3 reviewed. Minimum hardware requirements: Macintosh 512KE with two floppy disk drives. Not copy protected.

MACUSER RATING

EndNote ½

Follows Mac Interface	■ ■ ■ ■ ■
Printed Documentation	■ ■ ■ ■ ◧
On-Screen Help	None
Performance	■ ■ ■ ■ □
Support	■ ■ ■ ■ □
Consumer Value	■ ■ ■ ■ ◧

Comments: Database management for bibliographies designed to work in conjunction with a word processor. **Best Feature:** Allows for formatted in-text citations to be pasted directly into a word-processing document and then creates a bibliography from the citations. **Worst Feature:** Cannot print out formatted bibliographies from within the application itself. **List Price:** $129. Published by Niles & Associates, 2200 Powell St., Suite 765, Emeryville, CA 94608; (415) 655-6666. Version 1.0 reviewed. Not copy protected.

reference types (though in a limited fashion) as well as different bibliographic styles. Its search and sort functions are superior to those of EndNote. It has some unique conveniences such as a glossary for journal names and a routine that automatically detects and deletes any duplicate references that may have crept into a reference list.

On the down side (and I'm looking at a beta copy — the program hadn't been released at press time), Bookends Mac has no ability to format in different font types, sizes, or styles. As in Publish or Perish, this means that you may spend much time with a word processor, adding underlines to titles and so on. Also, Bookends Mac cannot do any form of in-text citations. In a problem related to the HyperCard connection, each separate data file must start as a duplicate of the master stack — a reference list starts at 230K even before the first name is added. Also, its printing capabilities are limited by HyperCard's less than stellar features in this area.

For more information, contact:

Publish or Perish 2.2, Park Row Software, 1135-C Garnet Ave., San Diego, CA 92109; (619) 581-6778. Minimum hardware requirements: Macintosh 512K. Not copy protected.

Bookends Mac, Sensible Software, 335 E. Big Beaver Road, Suite 207, Troy, MI 48083; (313) 528-1950.

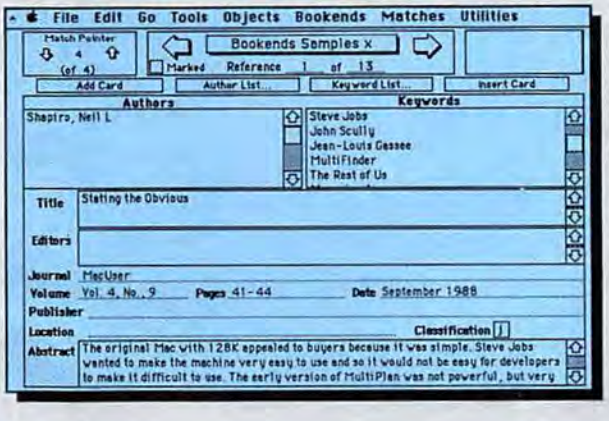
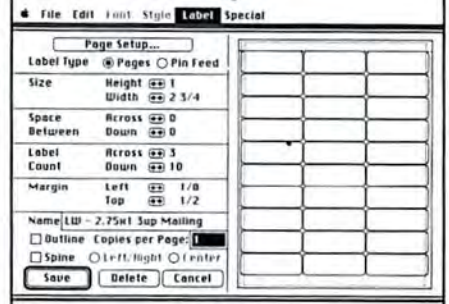


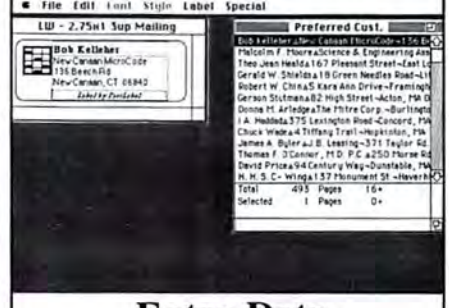
Figure B: The Bookends Mac Classification box indicates that this is a journal reference type (j). A separate routine, called Format Manager, is used to set up different bibliographic styles. The MLA style is to be included with the program.

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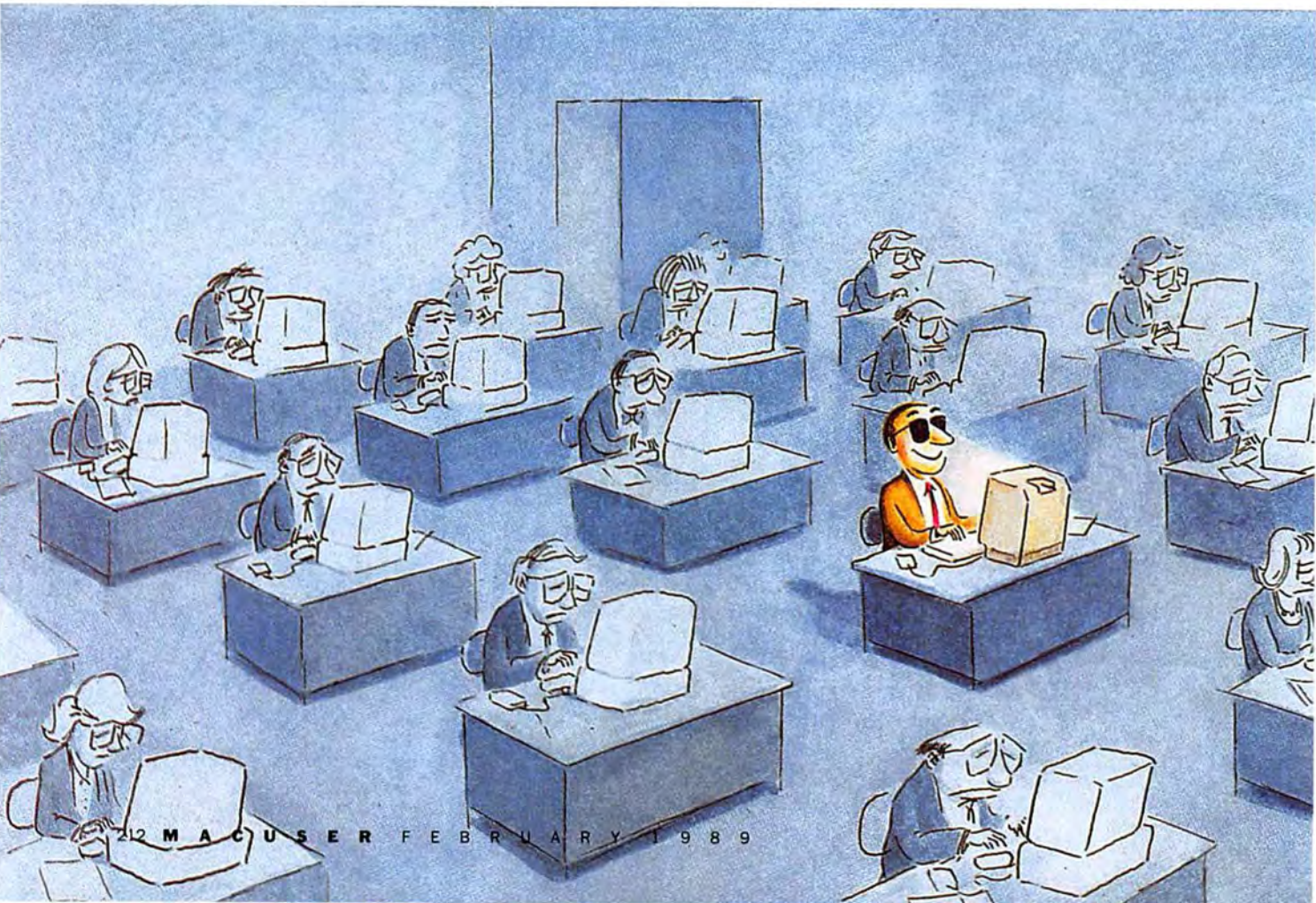
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Something Less Than Perfect

WordPerfect may be the perfect connectivity solution, but it's a good deal less than that for the average Mac user.



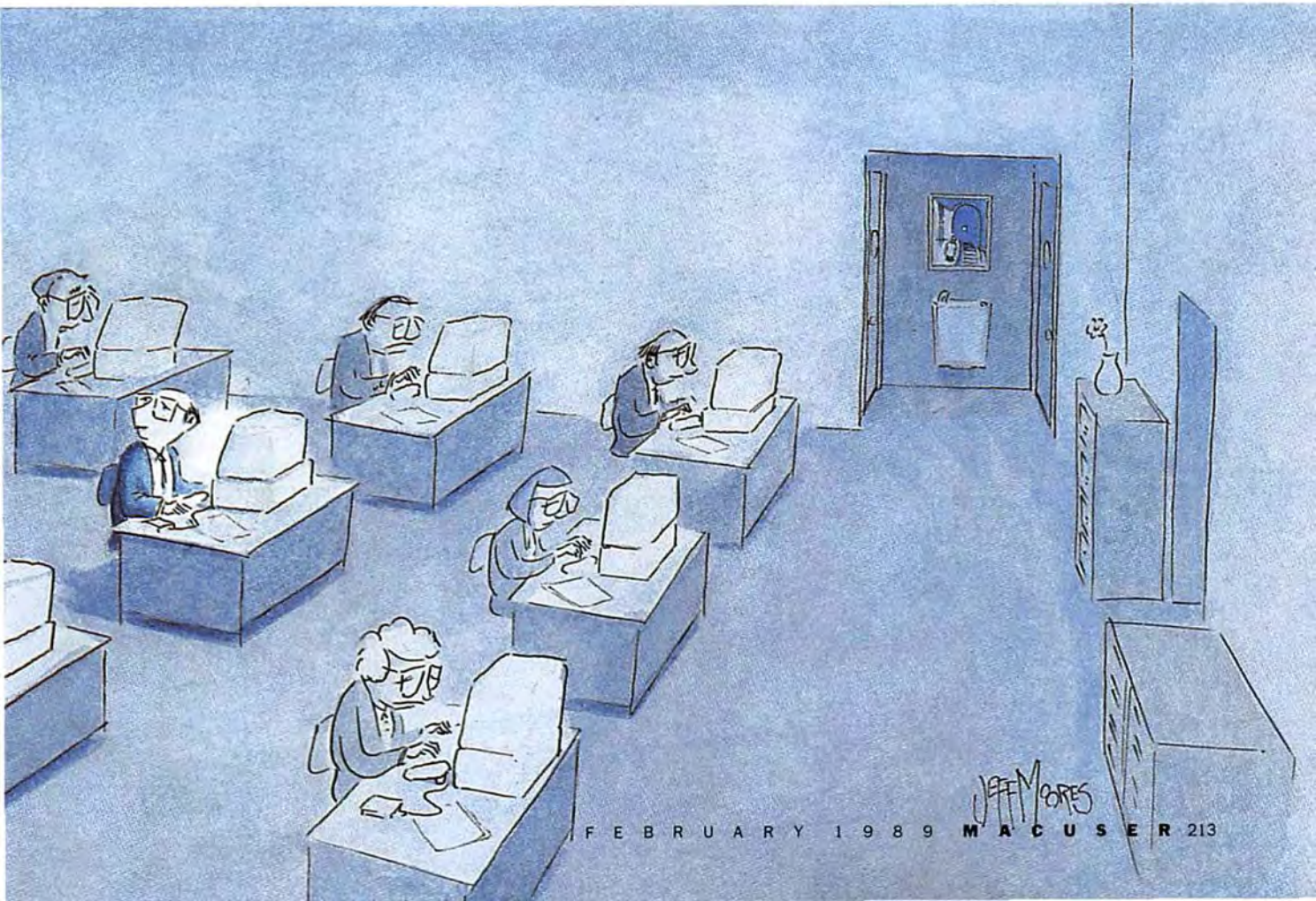
In Oliver Sacks' recent book, one of Dr. Sacks' patients literally mistakes his wife for a hat — an event that most of us would consider as unlikely as mistaking a DOS application for a Mac program. But then along comes WordPerfect, and suddenly that identity confusion doesn't seem so implausible.

WordPerfect for the Macintosh is WordPerfect Corporation's first Mac product, but in the DOS/IBM PC world, WordPerfect — now version 5.0 — is the best-selling word processor. It overtook and dethroned WordStar in the mid-1980s, when MicroPro left its aging superstar withering on the vine while promoting WordStar 2000. WordPerfect gained further popularity on the strength of its superb support staff and distinctive user interface with its dynamic on-screen page breaks, what-you-see-is-what-will-print display, and a system of function-key command combinations that cleaned the screen of menus.

WordPerfect was also one of the first companies to recognize the increasing importance of connectivity and compatibility as selling points in the Fortune 1,000 world. The program comes in a multitude of versions that run on everything from the DEC Rainbow to the Amiga, and it offers built-in conversion routines for files created with other popular business word pro-

BY CHARLES SPEZZANO

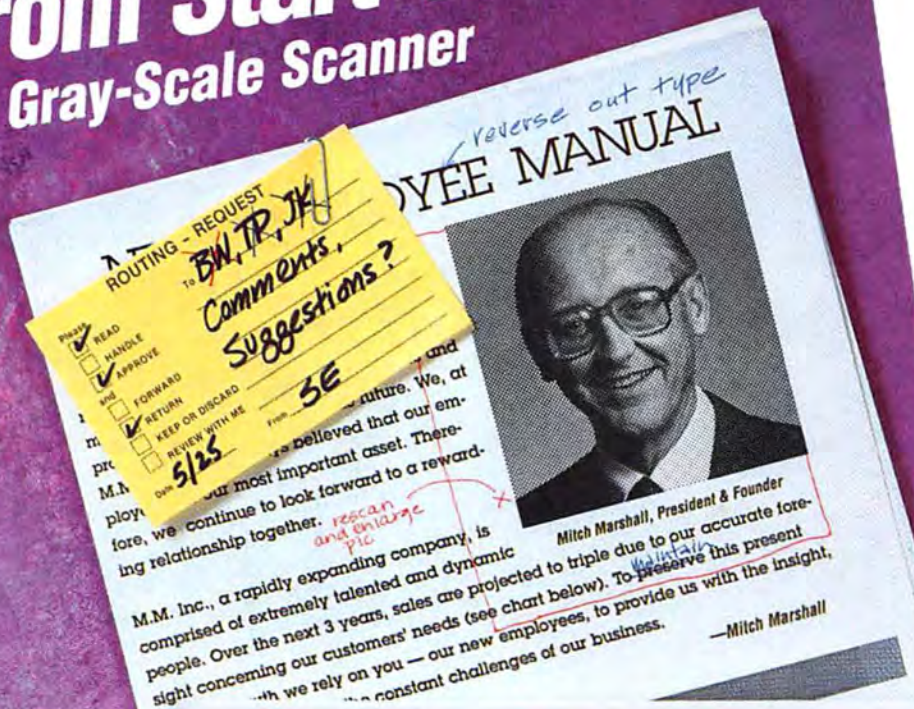
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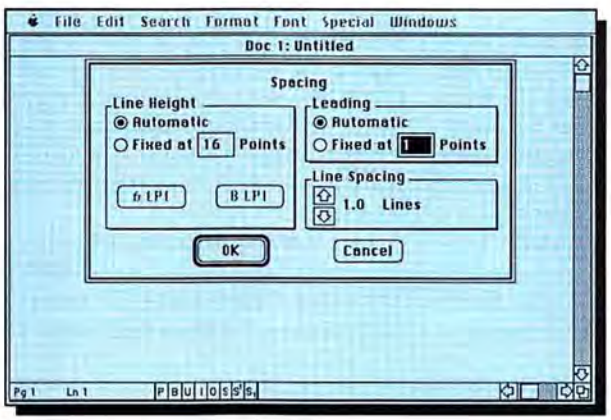
companies. PostScript of Adobe Systems, Inc. Macintosh of Apple Computer, Inc. IBM, PS/2 of International Business Machines Corp.

cessors. The program's interface is itself an important part of its connectedness. It retains its own, consistent look and feel on each system to which it migrates.

That is not the only rub with WordPerfect for the Macintosh. The fact that it retains its own look and feel accurately predicts where WordPerfect is aimed as it enters the Mac software market — at any business user in a mixed Mac and IBM PC environment where WordPerfect is already the PC word processor of choice. If your main criterion in determining the suitability of a Mac word processor is that it share a common file structure and interface with PC WordPerfect, then WordPerfect for the Macintosh is probably a good choice. If, however, you simply are selecting a word processor as the most effective software tool you can find for writing on a Mac, then WordPerfect quickly fades from the front-runner position.



WordPerfect's hierarchical menu system requires a steady hand. You have to drag down the main menu and then drag across to pop out the submenu.



You reach the Spacing dialog box only after making your way through a menu and a submenu. You click twice on the up arrow to change the line spacing from 1 to 1.5 to 2.

THE FAMOUS INTERFACE

Software packages can become prisoners of their own history. In 1983 and 1984 WordPerfect offered a clear and interesting alternative to WordStar, MultiMate, and Microsoft Word on PCs. I have used all these programs at various times on my PC and still prefer WordPerfect. On the Mac, however, it simply looks out of place.

Its hierarchical menu system is a good place to start arguing this point. On the PC, you enter a function-key combination, such as Shift-F8, and WordPerfect presents you with a menu of numbered choices. Your selection from that menu leads to another menu, and so on, until you reach the point where you have specified exactly what you want the program to do.

With WordPerfect for the Macintosh, that concept has been translated into pop-out hierarchical menus that are not as elegant a solution as the command-driven hierarchical menus were on the PC. To set double-spacing, for example, you pull down the Format menu, highlight Line, and, if the system is to work to its maximum effectiveness, slide the mouse over to select Spacing from a submenu that pops out to the right. But if, as it often seems to happen, you don't slide and click in just the right way, the main pull-down menu retracts, and you're back at square one. In theory, it's a cute idea. In practice, you need the fine motor coordination of Minnesota Fats to move the mouse quickly and still keep it right on track.

A frequently used feature like line spacing should be much more easily accessible than that. As it is, after you get through the two menus, you still have to click twice on an arrow in a dialog box to get things set. That's just too much work. As partial compensation, WordPerfect for the Macintosh, like WordPerfect in all its other incarnations, includes a very sophisticated macro-making system.

MACROS GALORE

Anything WordPerfect can do, you can do better with its user-definable keyboard equivalents or its macro maker. The program starts out with 100 Command-key combinations and 60 function-key combinations (for extended keyboards), but if that doesn't satisfy you, you can pull down the Apple menu and open WP Help or press Command-? for help. Any function listed as a topic can be attached to a keyboard command that you define as Enter-letter or Enter-Enter-letter. (See "Perfect Secrets," November '88, for tips on using this feature.)

If you want to automate a multistep procedure rather than a single command, WordPerfect offers a very good built-in macro facility. Once macros are defined, you can set them in motion by selecting their names from a list or by pressing a user-assigned Command-Option-letter combination. This feature was also covered in detail in "Perfect Secrets," November '88. As the author, Daniel Rosenbaum, pointed out, the macro facility would be an even more productive tool if there were a macro editor. Without an editor, you must completely recreate any macro that doesn't work correctly, or start over if you make a mistake while setting up a macro.

Macros can be made to repeat so that, for example, you can create a macro that automatically indexes all occurrences of a certain word — something that can't be done by any of the Mac word processors without macros that I've seen. You can also create a macro delay to display screen text and prompts during the execution of a macro.

WordPerfect has a pause feature that works while you are creating or executing the macro. Finally, macros can be nested and chained to automate entire document preparation procedures.

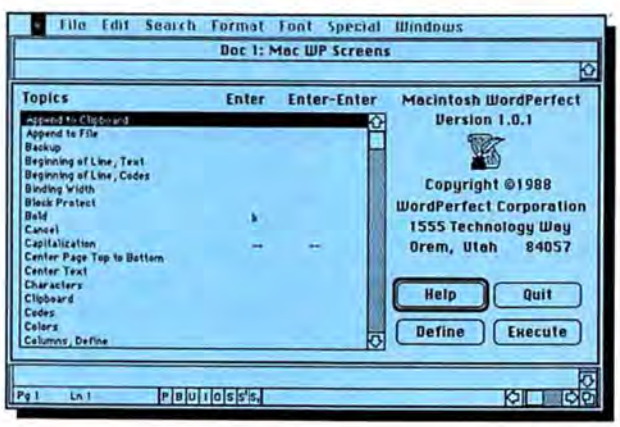
It is probably safe to say that a master WordPerfect user can customize this program to bypass much of what is not right with it to start. But not everyone wants to train for a ninth-degree black belt in word processing just to get along on a day-to-day basis, so it is fair to examine WordPerfect as it comes out of the box — especially since you can use third-party macro makers to build into any word processor many of the advantages WordPerfect's macro system offers.

REAR SCREEN ACTION

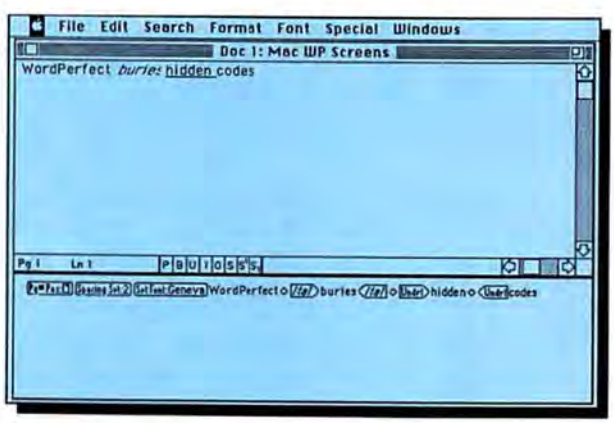
One aspect of its interface that helped WordPerfect compete successfully with WordStar was taking the codes WordStar put on-screen and hiding them "behind" the screen in a system of hidden codes. For example, when you made a word boldface with WordStar, you saw a ^B before and after the word on-screen. WordPerfect secretly inserts a similar <BOLD> code before and after a boldface word, but you can't see it until you press Command-7 to split the screen and reveal, in the bottom half, all the formatting codes you have inserted for boldface, underlining, indenting, font changes, page numbering, and other features you want in your printed document.

In a visually oriented environment like the Mac's, this is really overkill. Who cares what is going on behind the scenes when the document looks the way you want it to on-screen? When WordStar used visible codes, the codes were needed because you were not working on a WYSIWYG display. But the more formatting changes take effect on-screen, the less useful the codes become, hidden or not. If WordPerfect for the Macintosh's codes were kept permanently hidden, they would be a curiosity and not an annoyance, but at times, you're forced to deal with them.

If, for example, you have indented an entire paragraph a half inch from the left margin of a document and then change your mind, it would be easiest to have a way to select the paragraph quickly and unindent it. With WordPerfect you must move back to the exact position of the code on the Show Codes screen and delete the code. Then you have to hide the codes again. Or, if you have inserted a page-numbering code to start numbering pages in a particular way beginning with the second page, you cannot simply bring up a dialog box and change the order if you decide on a different way to number. You must search out the page-numbering code and either delete it or make sure you are inserting the new code after the old one. Whichever code comes last affects everything following it in the document. That means that a formatting change — even a margin change on a ruler — does not automatically restrict itself to the paragraph for which you intend it. To keep it from affecting all paragraphs after that, you must turn it off or reset it at the end of the paragraph you want to change.



In addition to getting help through the WordPerfect Help screen, you can also specify an Enter-letter, or Enter-Enter-letter keyboard command that will implement the function to which you attach it.



The Show Codes command splits the screen and allows you to view WordPerfect's hidden formatting codes. In version 1.0.1, you can position the cursor and select text and codes in the Show Codes portion of the window. You can also resize the window even when the codes are displayed.

PERFECT CONNECTIONS

There are a number of reasons why WordPerfect created such a Mac hybrid. First, the codes are not entirely useless. If, for example, you've indented twenty paragraphs in a report and then you want to realign all those paragraphs, it is easy to use a search-and-replace operation to get rid of them all at once. Mostly, however, the codes represent WordPerfect's desire to stay well connected with its DOS users and to be able to exchange files back and forth between Macs and PCs, although it seems to me that WordPerfect could have accomplished that

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without forcing Mac users to deal with the codes.

Even with Mac users using the codes, however, you would expect that if the Macifying of WordPerfect were going to be limited in an effort to keep it in the already-existing family of WordPerfects, then the trading of files would have been thoroughly checked before the product shipped. It may be asking a lot to expect a program to trade files perfectly with a competing program, but why not with its own blood relative? Unfortunately, when I tried to move a document I had written on a PC through a DaynaFile disk drive and over to the Mac, the footnotes did not all display appropriately.

So I fixed them and then sent the document back to PC WordPerfect. Page breaks were inserted after every footnote. I had to create a search-and-destroy macro to avoid tediously removing each page break manually. WordPerfect knows about the problem and is working on it, but that should have been caught in-house. According to the technical support person I called in October, WordPerfect still had not even tried the PC-to-Mac translation with footnotes yet! That's not the high-quality control I have seen from WordPerfect on the PC side of the product line.

When I tried to move a document I had written on a PC over to the Mac, the footnotes did not all display appropriately.

Most but not all other formatting worked well in both directions. Once there was an extra space at the beginning of each paragraph. Again, a search and replace of all double hard returns followed by a space with double hard returns and no space cured the glitch, but it's a problem that shouldn't occur.

ALL'S WELL THAT SPELLS WELL

The WordPerfect spelling checker has always been the best in the PC world, and it's definitely in the running for most-valuable feature of WordPerfect for the Macintosh. To begin with, it starts right up. No waiting for the entire file to be processed before checking begins. And it flies through the document after that. When it finds a misspelled word, the program almost always provides, among the suggested corrections it draws from its 115,000-

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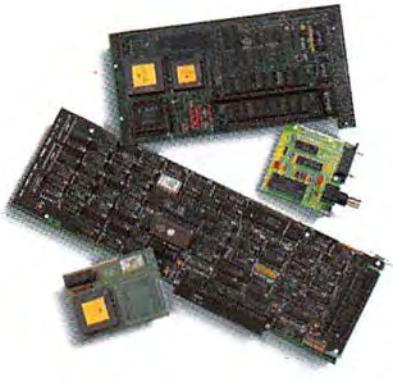
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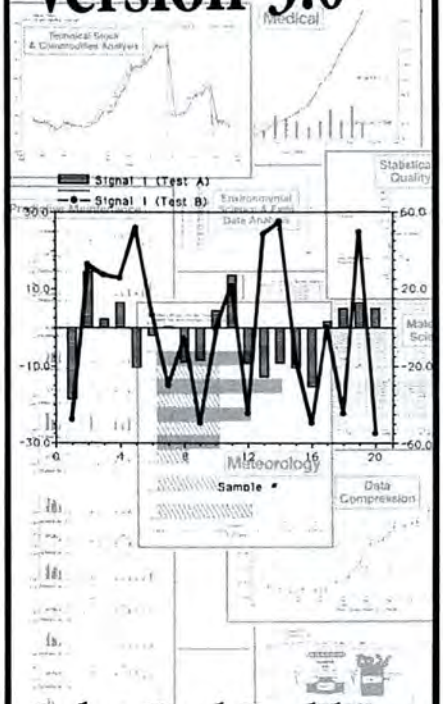
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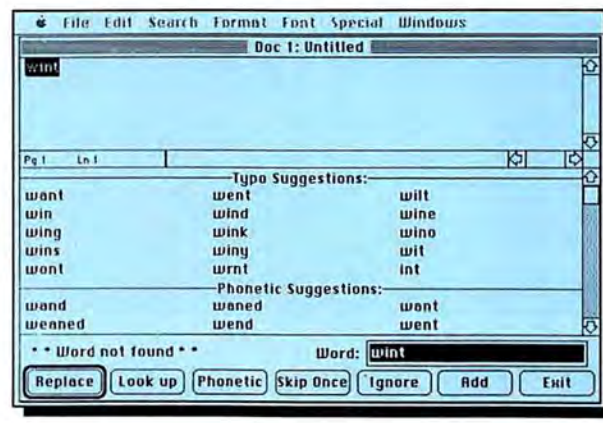
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word dictionary, the word I want. Some of the suggestions are determined by an algorithm similar to that in other spelling checkers, but in addition there are phonetic suggestions for each word flagged. Between the two you can reliably count on getting your word.

Equally appealing, and rare on Mac word processors, is that WordPerfect not only shows you the flagged word in context on the top half of the spelling screen, but it also lets you enter the document and make other changes you might see along the way without requiring you to exit the spelling checker. Just click where you want to make the change and move around within the document as if you never had left it. Then double-click on the flagged word to resume the spell check.

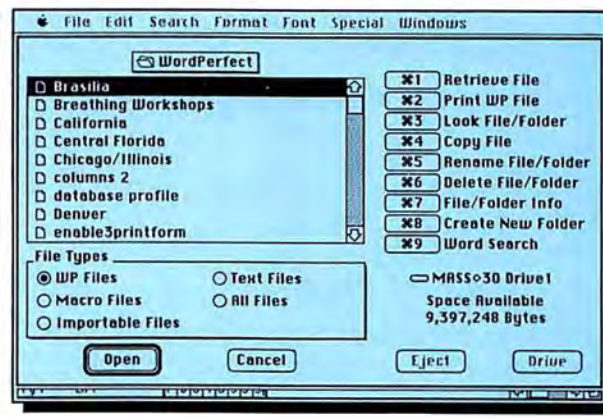
The thesaurus is also a winner. There are 10,000 headwords that you



In WordPerfect's spell check screen, both typographic and phonetic suggestions are displayed.



The thesaurus allows three levels of cross-checking. After the list in the left column was displayed, a synonym search was initiated for one of the words on that list, creating the middle column. Then a similar search was initiated for a word from the middle list, resulting in the right column.



WordPerfect's File Management dialog box offers a comprehensive system of file management functions that operate from within the program even while files are open.

can look up, linked to 100,000 synonyms and antonyms. The system allows three levels of cross-referencing to be displayed on the screen at once.

FIRST-CLASS MANAGEMENT

Another shining feature of WordPerfect is its comprehensive file-management system, which is accessed from the File Management dialog box. No other Mac word processor comes close in this category. You can copy a file, delete and rename files or folders, and create new folders — all without going outside the program. You can even have WordPerfect search through a disk or folder to find all the documents that contain a specific text string of up to 20 characters.

WordPerfect also allows you to peep into a file or another folder without opening it. If you are using the document search feature to locate a file and, even after seeing the list of files containing the keyword or key phrase, you still are not sure which document you want, you can use the Look File/Folder feature to examine all of them quickly. The two features used together give WordPerfect a unique built-in text database capability, lacking only AND, OR, and NOT qualifiers.

With the Print command from the File Management dialog box, you can open and print a file in the background while you are editing another, and the opened file will be closed automatically. Password protection for files is also available.

TO PUBLISH OR NOT TO PUBLISH

That is a very different question in the Macintosh environment than it is in the PC world. WordPerfect 5.0 for IBM-standard computers boasts of its ability to integrate text and graphics, display newspaper and parallel columns on-screen, and mix fonts without ruining your line formatting. That's just not big-time page layout stuff on the Mac. MacWrite mixed text and graphics in 1984. Flowing text around graphics is the hot topic in the Mac environment, but WordPerfect can't do it.

WordPerfect lets you have as many as 24 columns on a page. Both newspa-

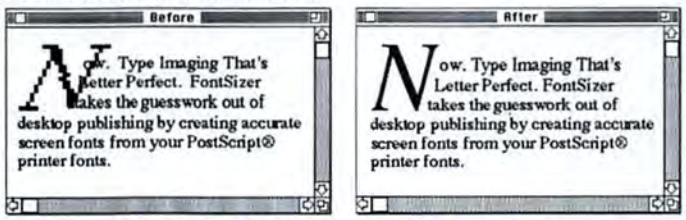
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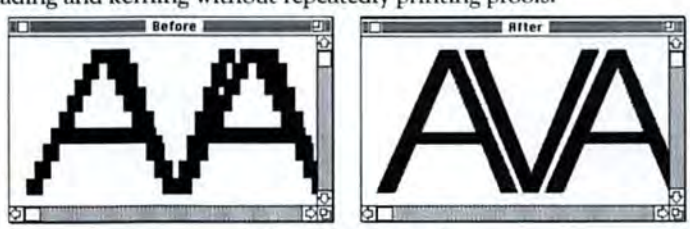
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per and parallel columns appear side by side on the editing screen. Unfortunately, you must balance the bottom of snaking columns manually if they don't end up even. There is no automatic balancing feature.

IS 1.0.1≥1.0?

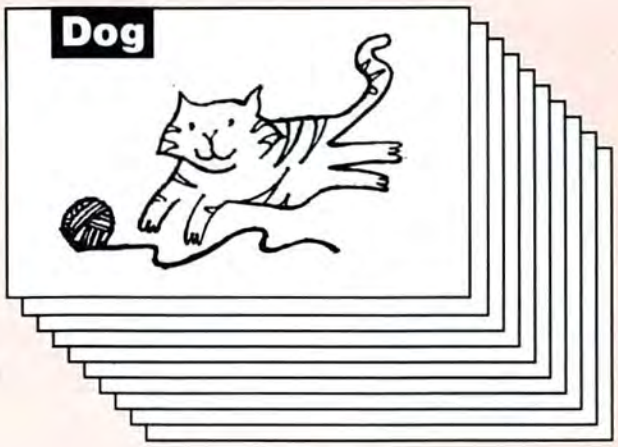
As far as I could tell, WordPerfect 1.0.1 clears up the program-crashing bugs that plagued the succession of reincarnations of version 1.0. It never crashed on me except when I tried to use it with System 6.0. Then it crashed infrequently but unpredictably. Some features performed erratically with System 6.0. At times various keyboard commands stopped functioning normally. At one point pressing Command-S selected superscripting rather than saving the file, and I had to exit and reenter the program to return to normal functioning.

Version 1.0.1 does not include built-in drawing features as once was expected. It does include enhanced freehand and proportional graphics scaling, the capability to turn off the WordPerfect interpretation of the function keys on the Extended keyboard if it conflicts with a macro or keyboard mapping utility you use, and an easier method for opening WordPerfect 4.2 files without having to change the type and creator of the files. When a word is selected by double-clicking, you can extend the selection a word at a time rather than a character at a time if you hold down the mouse button on the second click. The new Copy Ruler selection in the Format menu will copy a collection of settings from the current ruler to the clipboard, after which they can be pasted into your document at other points. Ruler sections that can be copied include left and right margins, hyphenation zone, page number position, tabs, justification, and column definition.

WHO'S SATISFIED?

When I first started writing with WordPerfect for the Macintosh, I was pleased to see some of the features for which I had developed an affection on PC WordPerfect over the years. The auto-paginating, spell-checking, and

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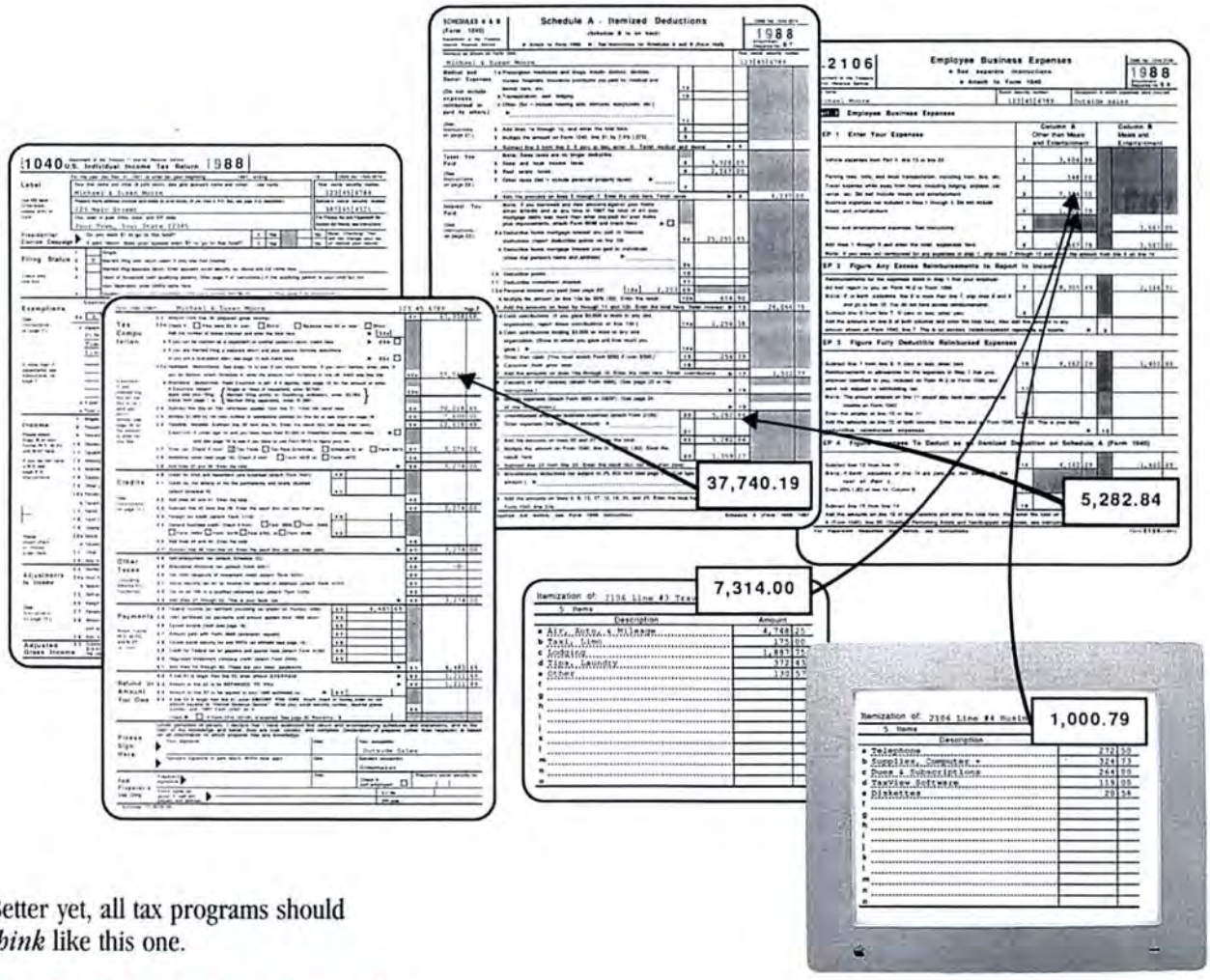
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file management systems did not disappoint me. The multiple headers and footers that can be suppressed on individual pages are a plus. The Auto-Save

> WordPerfect for the Macintosh is a decent program that nonetheless borrows itself from PC WordPerfect and fails in the process to develop a viable Mac personality of its own.

option works reliably and with minimal interruption of your work. The unique Insert Literal feature provides you with a chart of the complete character set for the font currently in use and, as the name implies, you can insert any foreign or special character on the chart with just a click. The manual is clear and comprehensive. The toll-free telephone support service is competent, and available on Saturday mornings.

Perhaps I'm ungrateful, but there was much that still did not satisfy me. In addition to the drawbacks covered already, the outliner remains the same dull paragraph-numbering system that I have ignored in PC WordPerfect. The screen has this horrible habit of rippling while it refreshes itself after you enter any string of text and then stop typing. If you decide to use the on-screen snaking columns, you will find that you can out-type it at the right margins with one hand tied behind your back.

Beyond these specifics, the program appears to be aimed primarily at people in offices where WordPerfect has already captured the PC desktops and where visually oriented Macs are rap-

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idly taking their place alongside the character-based IBM-type machines. WordPerfect for the Macintosh makes little attempt to capture any segment of the Mac writing audience on its own merits as a Macintosh program — as usual, close only counts in horseshoes.

WordPerfect lies uncomfortably on the border between compact writing tools like MindWrite and WriteNow and the "almost desktop publisher," document-preparation systems like Word 4.0 and FullWrite Professional.

Psychologists sometimes use the term "as if" personalities to describe patients who behave as if they had a distinctive character of their own, while in fact they borrow opinions and personal features from people with whom they identify. WordPerfect for the Macintosh is a decent program that nonetheless borrows itself from PC WordPerfect and fails in the process to develop a viable Mac personality of its own.

CHARLES SPEZZANO, PH.D., WRITES ABOUT PSYCHOLOGY AND PERSONAL COMPUTERS. HE IS THE AUTHOR OF TWO BOOKS AND NUMEROUS ARTICLES ON IBM AND MACINTOSH HARDWARE AND SOFTWARE.

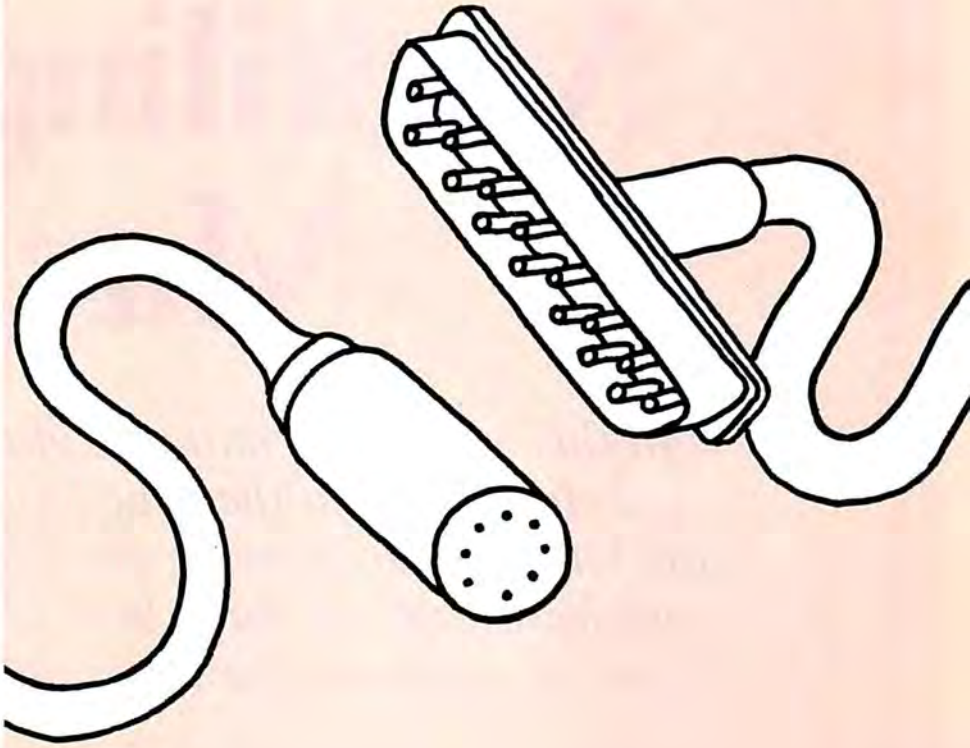
MACUSER RATING

WordPerfect for the Macintosh ★★★½

Follows Mac Interface	■ ■ ■ □ □
Printed Documentation	■ ■ ■ ■ ■
On-Screen Help	■ ■ ■ ■ □
Performance	■ ■ ■ □ □
Support	■ ■ ■ ■ ■
Consumer Value	■ ■ ■ □ □

Comments: Best-selling word processor in the IBM world minimally transformed for the Mac. **Best Features:** Internal file management system, spelling checker, and macro maker. **Worst features:** Hidden codes, complex hierarchical menu system, outliner that only numbers paragraphs, and screen that ripples when refreshing after any amount of text is entered. **List Price:** $395. Published by WordPerfect, 1555 N. Technology Way, Orem UT 84057; (801) 227-4288. Version 1.0.1 reviewed requires Mac 512KE. 512K of memory and System 4.1 or later. Two 800K disk drives or a hard disk recommended. Not fully compatible with System 6.0. Not copy protected.

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Multilingual Mac

In this era of international glasnost, it's nice to know that the Mac has linguistic capabilities. But knowing other languages is only one hurdle on the track to developing systems and applications for international markets.



Ethnic is in. Even if you're not considered ethnic, you can participate in "ethnicity" by dining at the latest Cambodian or Ethiopian restaurant and learning a bit about the culture. The Mac is a participant in this latest trend of using foreign languages. Realizing the Mac's potential for selling in foreign markets, Apple has branched out to such countries as France, Belgium, and Japan, to name a few. Because of this move, software companies have had to be more concerned with understanding foreign languages and cultures.

Some companies like Symantec and Microsoft have already followed Apple into the foreign markets. They have embraced the notion that the Mac should be accessible to everyone,

PHOTOS: TOM UPTON, STYLIST: DIANE MCGAULEY

BY KRISTI COALE



regardless of the local language, and they have been working hard to accommodate these complex language needs. The relationship between Apple and these companies is symbiotic. To push more Macs into foreign markets, software must be readily available. Similarly, for these companies to sell any software, the Mac must be present in the market.

The most common packages available on the international market are word processors and page-layout programs. Word, MacWrite, PageMaker, Ready,Set,Go! and QuarkXpress are all available in international versions including French, Swedish, Norwegian, Danish, and Spanish. Aldus recently came out with a Kanji PageMaker, and by the time this issue hits the stands, Quark will enter its addition to the Kanji line of page-layout programs. And they are not the only players in the move toward Mac internationalization. Even you small developers (relative to the major companies) can put together a foreign package, but you have some issues to consider.

How would you accommodate non-Roman alphabets? Does Apple have some provisions for differently scripted alphabets? If so, how can you, as an independent developer, obtain them? If you're a prospective developer or just interested in foreign software, you should know about things like localization, the Script Manager, Script Manager compatibility, and translation, to name a few. But there's more. What is Apple doing to help developers with their foreign-language packages? If you do have a foreign-language software package, how will it be distributed abroad?

LINGUAS EN LAS MAQUINAS?

The Mac is certainly not the first computer to embrace foreign-interface systems. In point of fact, development of foreign-language software has a history dating back prior to the Mac's beginnings. Since 1978, software developers have been concentrating on bringing Japanese packages to computers. Reasons for this include the push within U.S. companies to enter the Japanese market as well as the demand in Japan for software. The challenges presented by the alphabet also kept developers focused on Japan. And they still are — Apple is using Kanji as a test case for its non-Roman alphabet System software.

The first language-system software was developed by Xerox PARC for its personal computer workstation, Star.





Text was seen as a universal concept, encompassing any language no matter what the alphabet or character width. *Flexible encoding* lets users work on Roman and non-Roman alphabet languages. In this system, each character in a particular language was represented as a sequence of bytes based on ASCII codes. From this base, binary code numbers were assigned to each of the world's alphabets, creating *shift alphabet* signals. This concept of character representation was carried over to the Mac.

Since this method of handling different languages has existed for ten years, why is there such a fuss over the Mac's facility with foreign languages? For one thing, thanks to foresight in the architecture of both Macintosh hardware and software, the task of adapting to other languages is much easier on the Mac than on other computers. Instead of having to tear up the actual code of individual programs, Macintosh programmers can take advantage of a modular, "blanket" system for creating foreign versions of software.

THE LOCALIZER

Localization is akin to reverse engineering — you have all the menus, dialog boxes, and windows in English, and you must customize them for a specific language, keeping in mind how the foreign user will understand the program. For example, if you're shipping your product for use in France, all the aforementioned items, along with documentation and packaging, should be in modern French.

The Lingo of Learning

Among the few language-software programs available is Conjugate! Spanish, a verb-conjugation tutorial from Macadamia Software of Tennessee. This program is an effective tutor. A user clicks on the program icon and is given an exercise window. At the top is the infinitive of a given verb. Another window indicates the tense and person the drill wants. If you're wrong, you get one chance to redeem yourself; otherwise, the program tells you the right answer. As you run through a list of verbs determined by the program, Conjugate! redrills you on the ones you missed.

Through the menu bar, you can choose the verb form (*-ar*, *-er*, and *-ir*) and tense. This is good if you need to work on a specific tense of verbs. If you want to test your vocabulary, you can choose to view the drills in Spanish. You can also select not to see the English translation of the verb.

Through Kinko's Academic Courseware Exchange, you can get another language program called MacLang. The idea of this program is to let language teachers inexperienced in computers write "computer-assisted language learning" exercises on the Mac.

Though MacLang is geared toward teachers, any individual user interested in learning languages can use it too. You'll write all your own lessons. It comes with two disks, one for the "Author" of the lessons and the other for the "Students." You have your choice of writing lessons for French, Spanish, German, Italian, Portuguese, Rumanian, Russian, or Greek. Exercises are of three types: vocabulary, fill-in-the-blank, and paragraph. For vocabulary, the student will be tested on word-equivalency translation, synonyms, and matching words with a definition. The fill-in-the-blank and paragraph exercises test the student's ability to understand a language well enough to guess words as a result of knowing the context.

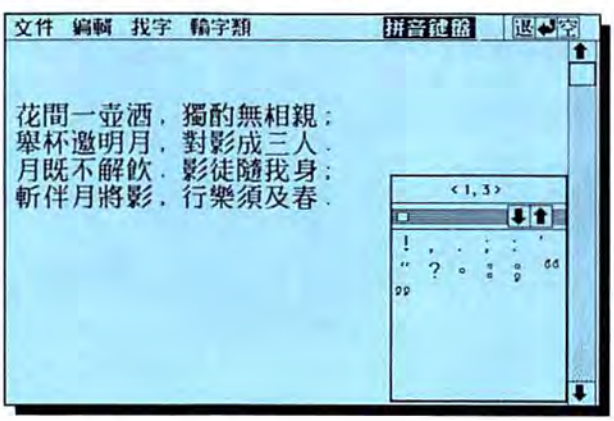
For all exercises, the student can choose how many tries are allowed at each drill before the answer is given. When you end a session, the program lets you know how you've done by tabulating the attempts and showing the number of correct and incorrect answers. Teachers can also keep track of how individual students progress.

Probably the best way to learn a language is to practice it orally. Realizing the effectiveness of this method, Articulate Systems of Berkeley has produced Voice Navigator, a speech-recognition system that should be out by the time you read this.

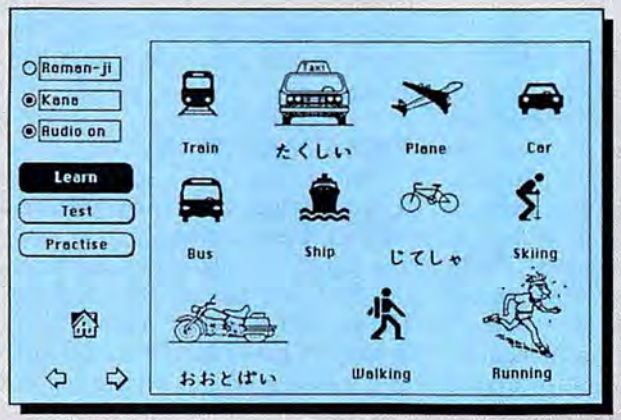
Voice Navigator, working with a HyperCard stack, enables you to teach your Mac

Localization is not the same as translation. You can translate manuals and other such documents through interpreters, but interpreters aren't necessarily programmers. To localize the application, you must maintain the Mac interface and the format of the program while incorporating the language.

Because localization is more technically involved, companies tend to keep this process close to their offices in the United States (or near their foreign subsidiaries, if they have any) while



Applications that aren't compatible with the Script Manager pose interesting problems. The Script Manager makes allowances for width of characters in a line. Without it, functions such as deleting will leave you with odd symbols and Roman letters in place of the actual character you're trying to achieve.



With HyperCard, Voice Navigator enables you to teach your Mac words in another language, such as Japanese. It then uses these words to drill you on vocabulary and pronunciation.

a list of foreign words, which it then uses to test your pronunciation and vocabulary. Drills come in three modes: learn, test, and practice. The user sees a Home Card with objects labeled in English.

For the purposes of testing Voice Navigator, Articulate Systems has chosen Japanese for its tutorials. In the test mode, different objects will be highlighted on the Home Card. At each object, the user will be expected to give the Japanese word. If your pronunciation or guess is wrong, a voice tells you and gives you another chance. If you don't know the word, you can say it in English and the computer will give you the Japanese.

For more information on any of these language tutorials, contact the following:

Articulate Systems
2380 Ellsworth St.
Berkeley, CA 94704
(415) 549-1013

Kinko's Academic Courseware Exchange
4141 State St.
Santa Barbara, CA 93110
(800) 235-6919, or in California, (800) 292-6640

Macadamia Software
2503 Essex Place
Nashville, TN 37212
(615) 383-2413

sending documentation abroad for translation.

To localize software, you must consider how the intended user will view the application. Everything from the Get Info box to any on-line help you offer in a package should appear in the language of the intended user.

For the ad hoc user, there are ways to get around localization problems. With software like Key Caps and various fonts, accents and other specialized foreign-language characters are readily available. But another problem arises when you want to create a document in a language such as Arabic, Russian, or Japanese. With only fonts and Key Caps available, creating a document in these languages is a cut-and-paste process. Localized software is a sophisticated solution to this problem.

A MANAGER FOR ALL SCRIPTS

To the layman, a *script manager* may be someone who works on the set of a movie. Actually, the Script Manager is a standard part of System software from Apple. It is the low-level code that extends the text-manipulation capabilities of the Mac beyond those needed for Roman scripts.

The Script Manager works within an application by calling on the Script Interface System. The Script Interface System provides the Script Manager with fonts for a particular language; keyboard-mapping tables; special routines for character input, conversion, sorting, and text manipulation; and a desk accessory for system maintenance and control.

The Roman Interface System is always present in the System file on the Mac. Other Systems can be purchased either directly from Apple or through the Apple Programmers and Developers Association (APDA). Currently available are KanjiTalk (version 2.0 was available at press time) for Japanese applications, the Arabic Interface System (2.0), the Hanzi (Chinese) Interface System (1.0), the Hebrew Interface System (2.0), and the Korean Interface System (1.0). These systems work just like the standard System software, but their menu bars, Apple menus, and dialog boxes appear in the alphabet of the specific language.

Though it's useful for European languages, the Script Manager is a necessity when working with languages that have non-Roman alphabets. Working in concert with the Script Interface System, the Script Manager allows, for example, an Arabic-speaking user to input text that will advance, wrap, and read from right to left. All non-Roman alphabets present problems in kerning, justifying, and delimiting.

In Kanji, the characters are 2 bytes





wide — Roman characters, along with most others, are 1 byte wide. As long as an application is compatible with the Script Manager, the byte size of characters makes no difference in terms of text entry.

As with Kanji and Hanzi, individual Arabic characters are modified according to surrounding letters. For example, when you place two letters together in a word, they form a new character that is different from the individual letters that made it. Another problem associated with this characteristic involves word boundaries. To take care of such difficulties, the Script Manager will intercept TextEdit calls. It then calls the interface system routines to perform functions like selection and word wrapping for a given script. This is also important for languages like Arabic and Hebrew that read from right to left — the algorithms in the Script Manager tell the Mac to enter text in the given direction. However, the Script Manager does not yet acknowledge this form of text entry for Chinese and Japanese, which read vertically.

Overlooked features in this multilingual process include the way dates and times are displayed. For these, you need to use International Resources included in the International Utilities package. Because Script Manager allows for multiple formats, new international (INTL) script resources (ordinarily with ID numbers 0 and 1) are added. They are now identified as itl0, itl1, and so on. You can use these within a field for timeCycle or dateOrder to format time and dates for the specific country.

IT'S COMPATIBILITY THAT COUNTS

Whether you're creating your own application or using one of the commercial ones available, it should be compatible with Script Manager. Script Manager is helpful in terms of hyphenation and keyboard layout, even for European languages. This is not to say that the Script Manager has a hyphenation dictionary — it doesn't. Just as the Script Manager manipulates text to allow for word-wrapping in such alphabets as Arabic and Japanese, it manipulates text to allow for logical hyphenation in different languages, depending on the Script Interface System in use.

Not all commercial packages are compatible with the Script Manager, however. PageMaker's European versions, for instance, are not. Hyphenation is taken care of within their internal systems. The same is true of Word — Microsoft incorporates a hyphenation dictionary of its own. Other packages, like QuarkXPress, base their hyphenation on Apple's foreign System software.

And speaking of Apple's foreign System software, can the average user get a Script Interface System from Apple? Well, it would probably be easier to go to the actual country for a specific language System. Apple has determined for now that they will not sell Script Interface Systems commercially in the U.S. You can, in certain instances, get one on special order, but it will surely take a while to arrive.

So, do you really need the foreign System to run, say, the Spanish version of Word? The answer depends on what you expect to accomplish with the package. If you need it just for making address labels, creating restaurant menus, or other small word-processing jobs, no. But if you're planning a job of the magnitude of staging a revolution in a country, say, and you need to write up the new constitution and other charters, or if you have other large word-processing projects, you'll probably want a language-specific version of the System software. You'll also want the keyboard specific to the language. Apple offers all its Macintosh models in popular foreign configurations. These come with custom keyboard layouts to handle a given language.

MAC'S SCHIZOPHRENIA

With all the Script Interface Systems available, the Mac can take on a number of personalities. Just as easily as toggling through desk accessories, the Mac can process text in Kanji, Hangul (Korean), or Arabic. Some developers have realized the potential of combining several systems on one machine.

MultiTalk, a multilingual operating system for the Mac, is one such byproduct of Apple's Script Interface Systems. Devised by a company called Write Approach, MultiTalk is based on and incorporates Apple's operating systems.

Using Interface Systems for Hanzi, Hangul, Kanji, and Arabic along with fonts supported through the Roman System for Cyrillic (Russian) and Greek among other alphabets, a user can take advantage of the Mac's capabilities, independent of language. MultiTalk can be customized to incorporate any language desired. Under one localized system, you can add any other language in which you want to work.

APPLE'S HOUSE CLEANING

Because foreign-language systems and script management are so closely tied to the internal workings of the Mac and the System software, Apple really holds the keys for developers of foreign packages. Until recently, developers big and small have had no clear path toward putting together their packages. Getting the most current versions of KanjiTalk, HanziTalk, and HangulTalk has been difficult. Why even APDA, Apple's designated distributor, has had this problem.

Thanks to a heated discussion regarding problems with availability of foreign System software at the Spring '88 Developers' Conference, Apple did some spring cleaning. Under its new

The Berne Convention

One of the factors affecting software developers is international copyright laws. Included in the international patent and trademark treaty is the Berne Convention, a "moral rights" clause meant to protect intellectual creations. Nations signing the Convention have a "moral obligation" to observe Berne's copyright laws with respect to works originating in other countries.

In terms of U.S. software, a company may send its package abroad for localization. The country in question cannot change the package in any way, save for localization. The software is still the property of the U.S. author, not the localizer.

While its trading partners have signed, the U.S. has not, citing minor incompatibilities with its own Copyright Act. For the time being, U.S. software products abroad are receiving the same treatment as European products, despite the United States' failure to sign the pact. There may come a time when European nations will tire of our receiving a free ride in this respect, and they may cease to honor the Convention for an unsigned country.

organization, Apple will offer business and technical information and help a developer to establish a chain of contacts in a given country through its Developers' Services department. The System software, packaged as *Tool Kits,* will be distributed through APDA.

GETTING THE PRODUCT OUT

Following Apple's lead into the international marketplace is a safe route to take — Apple can offer support. You're on your own if you choose to blaze new trails. And you should be aware of obstacles you may face.

Because Apple and so many developers are already established in Europe, distribution there isn't much of a problem. However, if you're a small company with no exclusive distribution channels and no foreign bases, you will encounter some barriers to entry just because you're an outsider. Aligning yourself with a major distributor is a great help in penetrating foreign markets. Even better, if your company has a lot of capital and personnel, you can set up your own foreign base.

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Patchwork

Editors and librarians can be a synthesizer's best friends. They'll organize and enhance all your batches of patches.

Time was, the most likely place to find an editor or a librarian was with his or her nose stuck in a filing cabinet somewhere. But in this increasingly anthropomorphized, computerized world of ours, that's no longer the case. The wisecracking cynic and the shushing spinster have been transformed into a new class of music software: the editor/librarian.

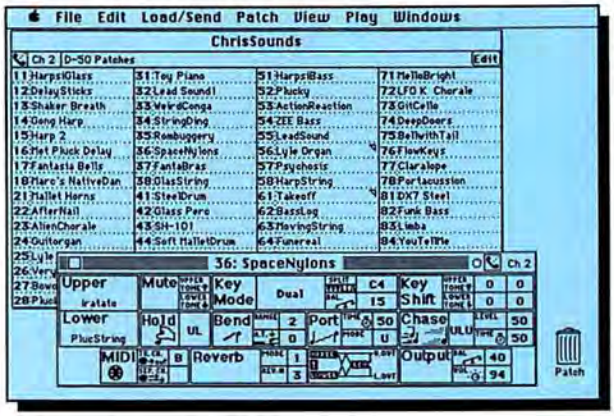
Most synthesizers can store a bank of instrumental sounds. To create a new sound, you have to enter a few dozen parameters that shape the distinct musical timbre that characterizes a particular instrument or effect. This set of parameters is called a patch, so named because you used to have to do this with actual patch cords.

Most synths can hold a few dozen different patches in memory at the same time, but you can also download this bank of patches and store them on a cartridge that slips into the synth. RAM cartridges can be used like floppies, storing the banks of patches you created earlier or that you bought from your synth's manufacturer (or a third party). With a library of RAM cartridges, your synth can create a multitude of sounds.

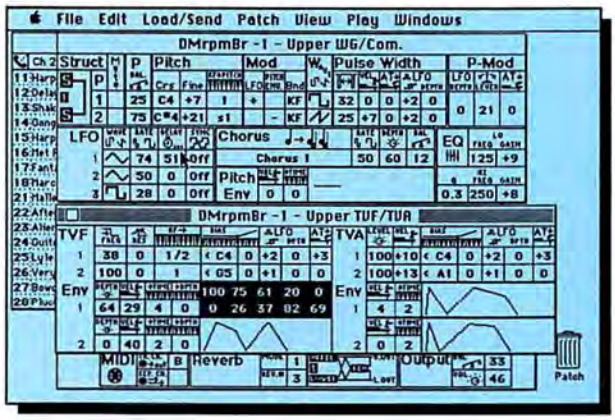
It can also create a multitude of headaches. If you're programming your own patches, you'll have to enter all the parameters through your synth's particular arcane interface, and that may be only the beginning of your problems. If a song calls for more

BY FREFF

WALTER DEBETT



After you click on Edit in Opcode's program, a window containing global D-50 patch data appears. Other sections of a patch can be called and edited using the pull-down View menu.



There are two ways to edit a time-based envelope in the Opcode system. Clicking on the small envelope graphic once replaces it with level and rate numbers, for numeric editing, while clicking on the graphic twice calls up a large window for graphic click-and-drag editing.

sounds than you can fit on one cartridge, you'll be popping them in and out at a rate that'll make you think you're using a 128K Mac. And if you think that sounds inconvenient, imagine doing all that swapping during a live performance. Plus, with a large collection of cartridges, even the most organized among us will have trouble finding that particular viola patch that's been collecting dust ever since that bar mitzvah gig last spring.

Fortunately, there is an alternative. Patch data can be sent from your Mac to a synthesizer (and vice versa) using a subset of the MIDI command set known as "system-exclusives." Patch editing and storage now become the computer's job. If your synth has a confusing user interface, ignore it. Use the Mac's interface instead. If $75 RAM cartridges, with their 64-patch capacity, are costing you the farm, don't use them. A standard floppy can hold as many sounds as $2,000 worth of RAM cartridges (around 1,500, depending on the synth's patch format).

Passing patches between your synth and your Mac is the easy part. So easy, in fact, that pretty soon you'll have so many sounds stored up, you'll want to start tweaking them, while struggling to keep them organized at the same time. Fortunately, technology has a way of expanding to fill the gap, and that's exactly what editors and librarians do. Editors let you massage your patch data, altering it to suit your specific need. Librarians let you store your patches in a way that keeps them organized and available. Some librarians can handle lots of instruments; some can handle whole families of related instruments; and others, only one.

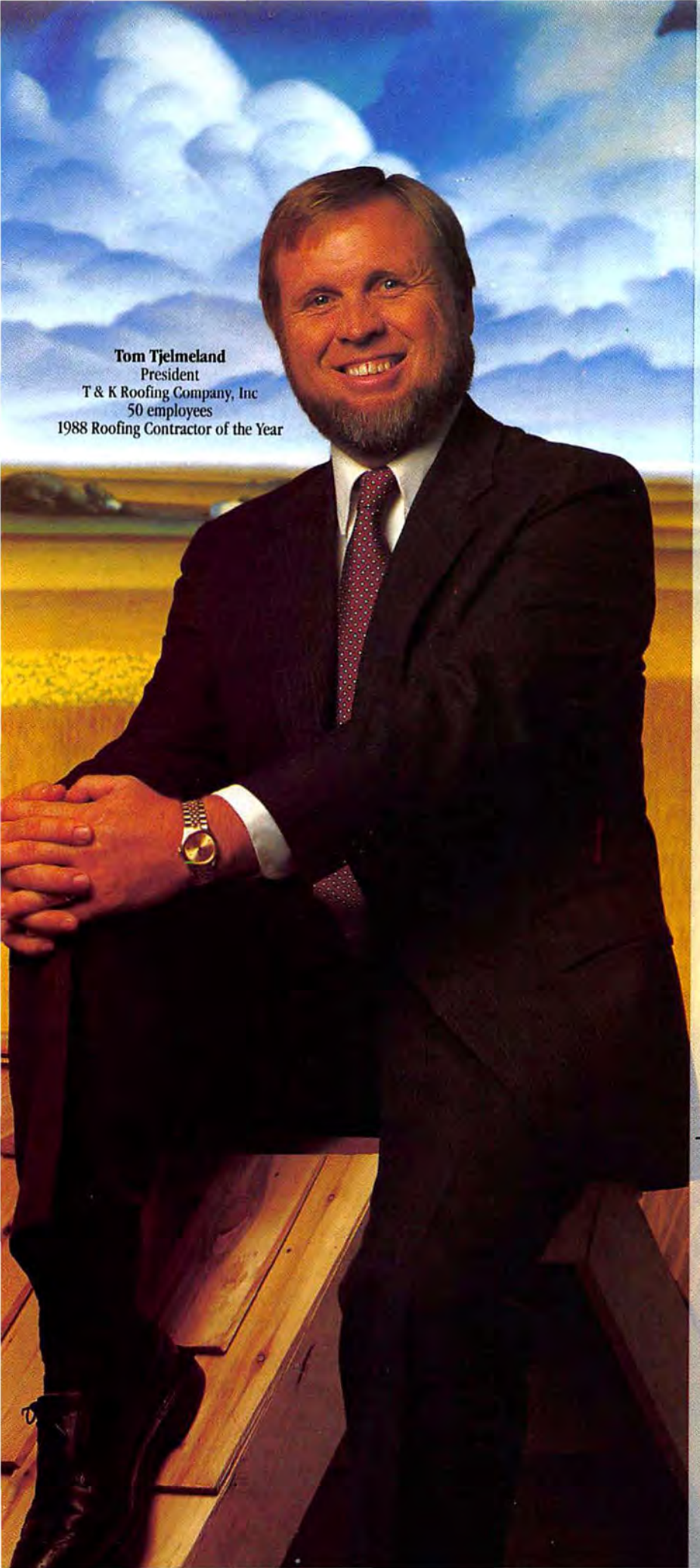
Editors and editor/librarian combinations are typically instrument-specific because of the different features different instruments offer, even within related families. The Roland D-50 is currently the world's best-selling synth — and one that's almost impossible to program from its own front panel, making it an ideal candidate for software control. The packages discussed here come from Opcode Systems, Dr. T's Music Software, Valhala Music, and Beaverton Digital Systems. They're designed to work with the D-50, but comparing and contrasting the way these programs handle their six basic tasks — storing, sending, auditioning, rearranging, editing, and creating patches — should help you in choosing the programs you'll want to use for your own synths, whatever they may be.

OPCODE BE-BOP

Opcode Systems is the first name in MIDI editor/librarians, offering more programs for more instruments than any other company. Because they lead the field in sales, their patch data format is becoming a de facto industry standard.

After you load Opcode's D-50 Editor/Librarian and select the appropriate port and frequency for your MIDI interface, a small piano-style keyboard marked *MouseKeys*, appears at the bottom of the desktop, along with a window for selecting which type of file to edit: D-50 patches, D-50 reverbs, or Bundles. There are separate files for D-50 patches and reverbs, because that's the way the instrument handles them (loading patches and reverbs together is done with the bundle file). The standard starting choice would be the default, D-50 patches. Click on OK, and you'll see another window with simple instructions on how to set the memory-protect and MIDI functions of the D-50 for the program to work. This is critical information. To Opcode's credit, they tell you exactly which buttons to press and in what order, so even if you know nothing about a D-50, you won't get stuck.

Once everything is set, clicking OK opens up a bank with 64 blank patches. These correspond to the 64 voices in a D-50's internal memory and are numbered, just as in the instrument, in octaves: 11-18, 21-28, 31-38, and so on up to 88. If you find this confusing, you can select View by Program Numbers in the Load/Send menu and see the patches listed as 1 through 64 instead. This can be confusing in a different way, however, since the MIDI proto-



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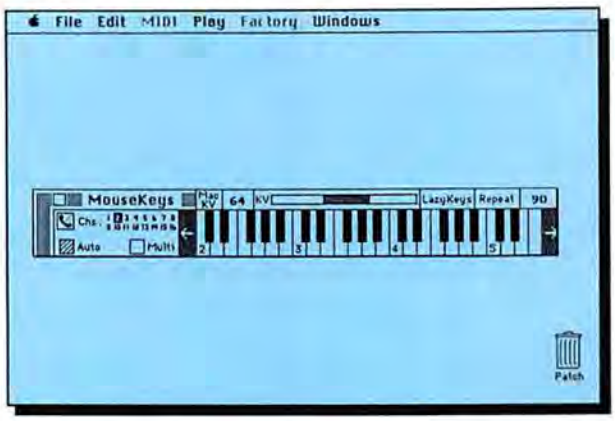
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This is the Opcode MouseKeys window, used for playing the D-50 without getting up from your Mac. It has a ten-octave range, is velocity-sensitive within a specified range, and can send notes out over either single or multiple MIDI channels.

col for program numbers starts at 0, not 1. (Unless you're Philip Glass, you're probably confused, but don't worry; it'll all make sense when you do it.)

The Load/Send menu has the choices you need to start work: getting and sending banks and individual patches. The Get Patch Bank from D-50 command does exactly that, loading the 64 patches in the D-50 into the Mac and displaying them on-screen. The transfer takes about 25 seconds, the same time it takes to send a bank the other way. This is slower than some other programs. The D-50 must be in Play mode when uploading to your Mac. Otherwise, instead of the full bank, you'll get 64 identical copies of whatever voice is active at the time.

Clicking on a patch selects it for editing, name changes, cutting, copying, pasting, and other manipulations. With the exception of editing, all of these operate in keeping with the standard Mac interface, so renaming sounds and shuffling them into new orders or from one bank to another is simple. Opcode's manual says that up to eight bank windows can be open at one time, but in my tests, the program would hang with more than seven. Pressing Option before clicking lets you grab and drag a patch to any other location. Finally, if Send on Select in the Load/Send menu is on, clicking on a patch automatically sends it out to the D-50's edit buffer so you can listen to your edited patch.

Auditioning is done in any of several ways: playing the D-50's keyboard, using the commands in the Play menu; tapping the Mac's keyboard (Z is middle C); or playing the keyboard graphic in the MouseKeys window, which sends MIDI note data out to the synth. The Play menu commands let you record an original sequence or play any previously recorded sequence that has been stored to disk in the standard MIDI file format. The only length limit is available memory, and playback can be set to repeat until turned off. Other commands set playback to begin automatically whenever you select a new patch or edit a patch setting. In the case of the latter command, you can save your sanity by using it only when you're working with very short sequences.

The MouseKeys window is the most flexible way to explore new sounds and test patch edits without getting up from your Mac. It has ten octaves of velocity-sensitive keys which, as the name implies, are played with the mouse. Only 3½ octaves are available at a time, but the octave shift arrows let you pick ranges. Clicking higher on a key produces a softer note; clicking lower produces a louder one, with the range from lowest to highest velocity adjustable through changes in the Key Velocity display at the top center of the window. Click on LazyKeys, and notes will trigger automatically as the mouse slides across the window. Repeat causes the most recently played note to retrigger at a selected rate until Repeat is shut off. Another useful feature is the capacity to send notes out on more than one channel at a time so that patches can be auditioned in combination with other instruments.

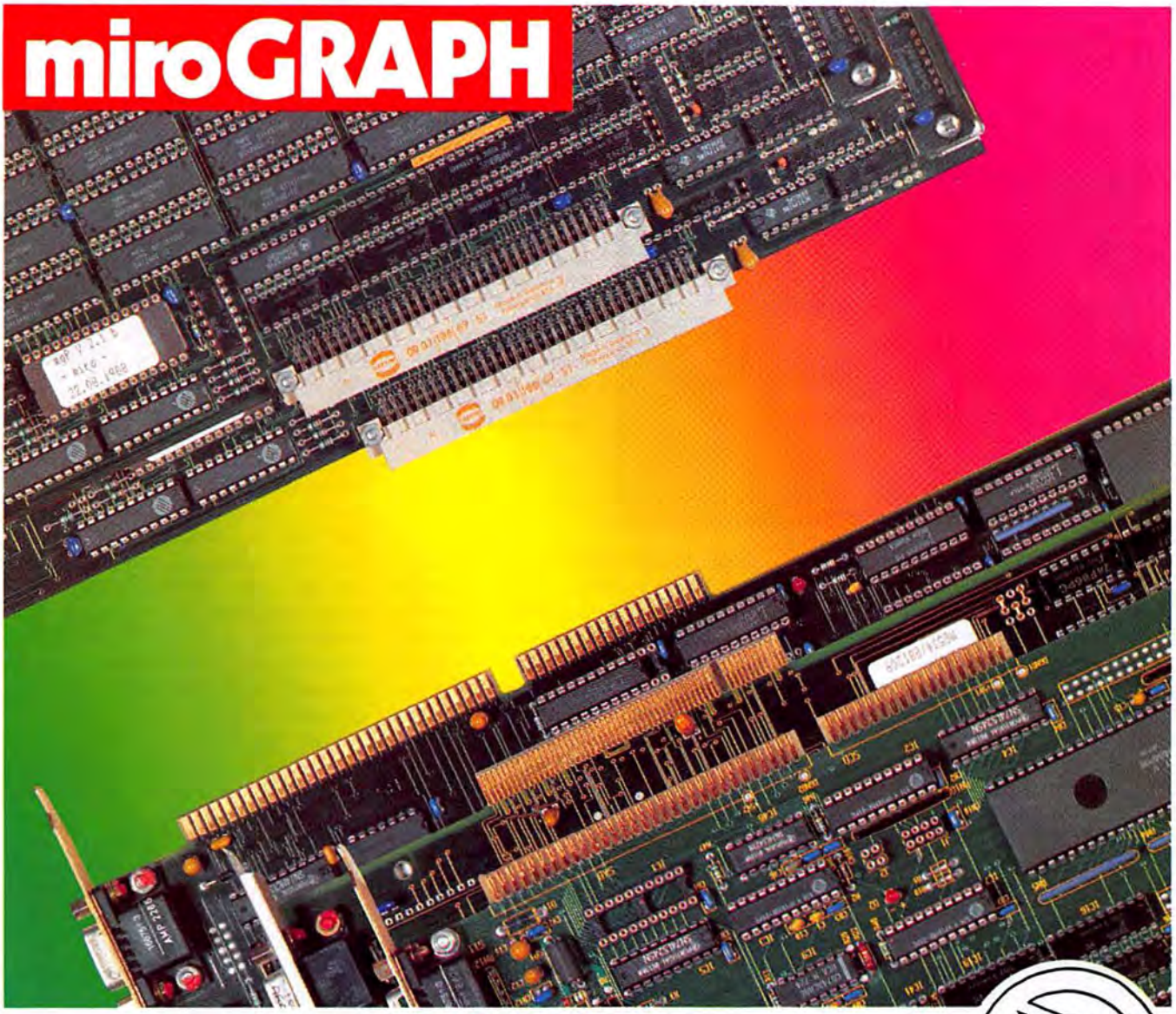
D-50 banks have 64 patches and so do Bank files. Opcode also offers another kind of file, called a Library, that is limited only by available memory. Libraries can hold thousands of patches, making them useful for organizing sounds by kind, such as saxophones, strings, or spacey stuff, or by project. Libraries are organized alphabetically, and patches can be cut, copied, and pasted back and forth between them and Banks at will. Opcode's Libraries also have settings that let you cull out patches that are duplicates in either name or data.

Now for editing. In the upper-right corner of both Bank and Library windows is an Edit button. Select a patch and then click on Edit, and you'll see a new Patch window and two new menus: Patch and View. In the window, which is jammed with a clutter of little boxes, numbers, and symbols, are most of the D-50's "global" parameters: that is, the settings that affect the instrument as a whole. The Patch and View menus contain the commands that let you select which patch, or portion of a patch, you want to edit.

Each D-50 sound has more than 400 possible settings, a number big enough to hamper even computer-based editing. Without turning this overview into a D-50 tutorial, suffice it to say that there are seven basic structures within each patch — the Upper and Lower settings for Partials 1 and 2, the Upper and Lower Common settings, and the global Patch settings. A good D-50 Editor must provide access to these structures in a useful way.

Opcode subdivides patches differently, into Upper and Lower Tones, each consisting of two Partials and their associated Common settings. These are combined into two windows, one marked WG/Com (for Wave Generators and Common data) and one marked TVF/TVA (for Time Variant Filter and Time Variant Amplifier). This means that you can ask for Upper Tone in the View menu and see Upper Partial 1, Upper Partial 2, and Upper Common all together in these two windows; or you can ask for Wave Generators and just see the WG/Com windows for both the Upper and Lower Tones. Since all these settings are interactive, and since there are times when you'll want to come at

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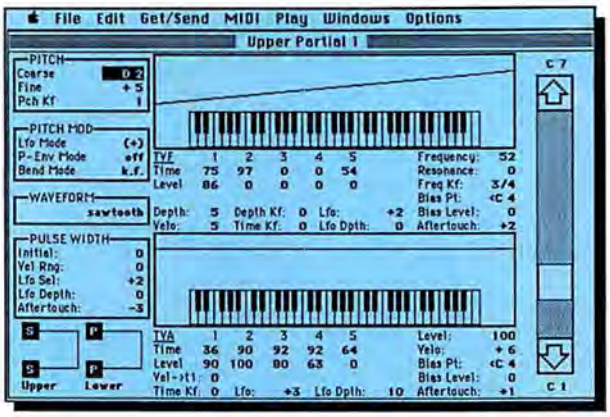
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Organization is the key to making editing more convenient. Dr. T's program gives each section of a D-50 patch its own clear, easy-to-follow screen. The program also lets you switch back and forth between graphic displays of envelopes and keyboard bias.

them from a nonstandard angle, this is good. But because they're all on the screen at once, overlapping other windows that can't be put away without canceling the editing session, the resulting visual clutter is initially as daunting as that of the D-50 itself. Opcode's strong point is not clarity of graphics. In addition, choosing to organize the settings differently from Roland means that cross-referencing to a D-50 manual or third-party instruction book will be more difficult.

Actual editing is easy enough, though, once you find the function you want to edit. Numerical values can be changed by clicking on them and then either by entering new numbers from the Mac's keyboard or by positioning the mouse so that the cursor turns into an up or down arrow and then clicking to increase or decrease the value. Time-based envelopes like the TVF and TVA settings can be edited as numbers (click once) or as graphic envelope displays (click twice). In these special Envelope windows, changes are made by clicking and dragging on boxes at the juncture points of the envelope segments. For settings with lots of nonnumeric choices — like picking which Partial to use among the many stored in the D-50's memory — Opcode has chosen to use pop-up windows. If you click on the PCM Partial name, for example, and hold down the mouse button, you can highlight the partial of your choice. Once you've got it, simply let go to complete the change. And, finally, you can edit by copying and pasting Tones, Partials, or Envelopes within patches.

Beyond editing lies patch creation. Most editor/librarians contain one or more ways to generate raw material in the form of randomized or shuffled patches. Under the Factory menu, Opcode provides four such tools. Constrained Random lets you pick upper and lower numeric setting limits in the form of any two patches from an active Library or Bank and then generates a specified number of random patches within those constraints. Shade Two creates patches that are a smooth blend from one selected patch to another. Shuffler scrambles all the parameters in your active bank or library but doesn't change their location within a patch; it just moves them around at random to the same place in a different patch from the one they started from. Library Sampler, the last tool, doesn't actually generate patches — instead, it pulls patches at random out of a Library, creating new source material for the other patch-generating tools or for experimental MIDI orchestrations.

DOCTORING YOUR DATA

Typically, musician/programmers write MIDI software, but the balance isn't always even. Opcode leans to the programmer side; the folks at Caged Artist, whose programs are distributed through Dr. T, lean the other way — in this case much to their program's benefit. Dr. T's Roland D-50 Editor/Librarian is a solid, useful program written with the same natural sense of humor and reasonably clear organization as the short, easy-to-read manual that accompanies it. The stated goal of the programmers was to make the user's left-brain activity optional, and they very nearly succeed. It doesn't have as many features as the Opcode package, especially in terms of randomizing patches, but it is faster to learn, easier on the eye, and lighter on the wallet.

The program handles up to four banks of D-50 sounds (each with 64 patches and 32 reverbs) at once and lets you shuffle sounds around using the standard Mac techniques. It loads and sends banks much faster than the Opcode program (10 seconds) and has clearer editing procedures, with separate, well laid-out screens for each of the seven sections of a patch. In addition, the program offers a choice between Envelope and Keyboard Bias graphic displays for the TVF and TVA settings, simple ways to swap common data and change Partial tones (the two quickest and easiest ways to create usable new patches out of old ones), and the best approach to auditioning sounds I've found so far: Mouse Play.

At any time while you're editing, all you have to do is hold down the Command key, and the entire Mac screen becomes a playing field, with left/right cursor positioning controlling pitch and up/down positioning adjusting volume. In addition, holding down the Option key causes your choice of the D-50's controllers (such as modulation) to be played as well. This can create musically effective riffs that simply couldn't be played from the D-50's own keyboard. This is one of its strongest points. Its weakest is its randomizing, which works only on one section of one patch at a time, randomizing selected settings within percentages set in the program's randomization mask.

PATCH OF THE VALKYRIES

Valhala's D-50 Editor/Librarian offers four file types: D-50 Patch Banks, D-50 Reverb Banks, D-50 Libraries (similar to the Opcode approach), and Bulk Data files. Bulk Data files are used to load and send pure MIDI data, allowing the program to receive and send (though not edit) patches, sequences, and other instrument data. In theory, the program will open and edit D-50 patches in Opcode format as well as its own; but al-

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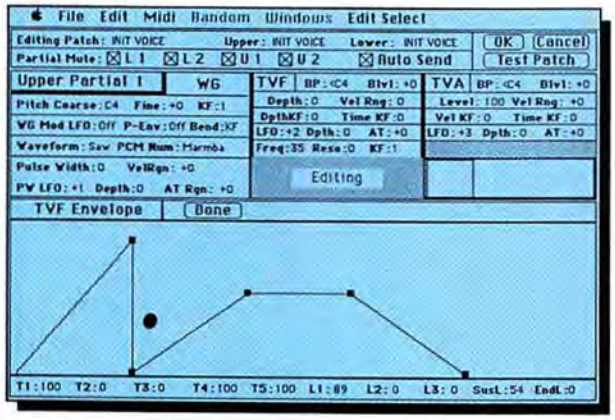
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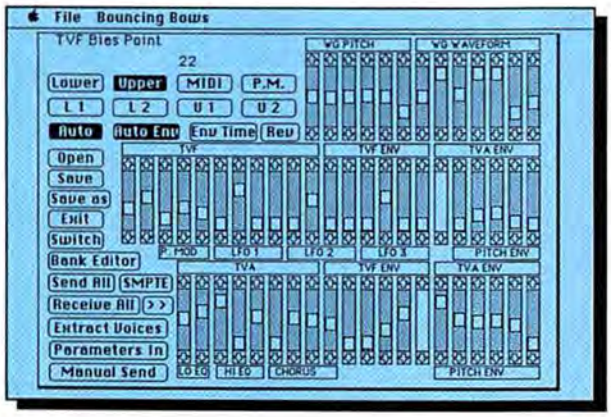
though I've verified that some people are using it that way, the copy I worked with wouldn't even recognize the presence of an Opcode D-50 file on a disk.

In general, this is a reasonably solid program. It offers more patch-generating functions than Dr. T (though fewer than Opcode), and clearer editing than Opcode (though not graphically as clear as Dr. T's). For auditioning, it offers sequence recording and playback plus a Keyboard window similar to Opcode's, with the addition of sending several types of controller data along with the triggered notes. The program's most innovative feature is called PatchSheet, which shows all patch settings in a list that can be scrolled through for editing. Since the cheapest way to buy D-50 patches is in printed form, PatchSheet provides a simple, if time-consuming, way to enter such printouts into your Mac.

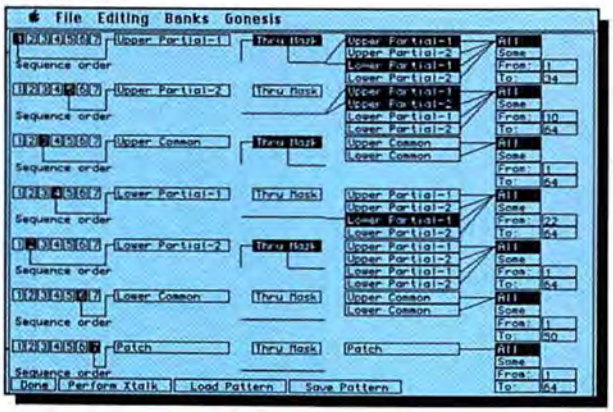
My experience with Valhala's program made me think it could benefit from several small upgrades. It always opened disk files half-off the bottom of the Mac screen, even when there was nothing above, and if sequence playback was cut off before the end of the piece, it would occasionally leave notes stuck on. More importantly, for anyone trying to learn the program, its manual is inadequate, poorly organized (there isn't even a table of contents), and arrogant. The program and Valhala's customers deserve better.



After double-clicking on a patch to edit it, the Valhala program displays the global Patch data and offers individual muting of the Upper and Lower Partials. More detailed editing is done by sections and includes well-realized graphic envelope displays.



Half of Beaverton's Editor/Librarian is a screen emulation of Roland's PG-1000 remote-programming hardware for the D-50. The top two rows of buttons determine what groups of settings are assigned to the screen sliders, which work by clicking and dragging. There are no pull-down menus; instead, their functions are offered as buttons on the screen.



The CrossTalk screen, unique to Beaverton's Editor, offers massive control over the shuffling and rearrangement of sections of D-50 patches, including the ability to filter a section through a preset Mask.

LEAVE IT TO BEAVERTON

Be warned. The Beaverton D-50 Editor/Librarian is not a program that believes in the standard Mac interface. But also be eager: While this program is not at all Mac-intuitive and has documentation that ranges between occasionally useful and almost always confusing, it is also the most powerful of the four programs in terms of creating new and useful D-50 patches. If your purpose is to store and load the patches you buy or trade and to tweak them from time to time, this program is not for you. But if your purpose is to create astonishing D-50 sounds, take a good long look.

The Beaverton system is really two programs in one. The first, D-50 Bank Editor, is the program used for saving, loading, rearranging, and creating/randomizing new banks. The second, D-50 Editor/Librarian, is a screen emulation of Roland's PG-1000, the hardware programming unit for the D-50. Beaverton recommends that you jump between programs using MultiFinder. It's a good idea, if you've got the memory, because shifting by other means takes 20 to 40 seconds.

These programs are wildly different from the competition, and this can be annoying. For example, to edit an individual sound you have to extract all 64 patches from a bank file, which creates 64 separate patch files on disk. Beaverton recommends putting related sounds into folders, thus turning the Finder's HFS into the equivalent of Opcode and Valhala's Library files. Editing individual sounds from the

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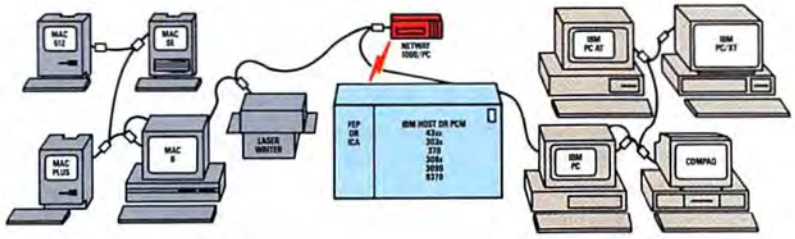
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PG-1000 emulation is aesthetically satisfying (lots of screen sliders!) but also demands that you know the D-50 pretty thoroughly. Mucking about here and there won't teach you much about the instrument or how it makes sounds. The constant deviations from the standard Mac interface (like apparent pull-down menus on the PG-1000 screen that really aren't there and just beep when you try to use them) will drive a Mac loyalist crazy.

But I'm still impressed. Beaverton has come up with creative tools that are worth the headache. First, their approach to patch generation through randomization and masking of patch settings is the most extensive available. Second, their CrossTalk system not only lets you shuffle Partial, Common, and Patch data but also lets you filter the data through the randomization mask. Finally, Beaverton has what they call a Universal Algorithmic Slider that lets you tie together any of the hundreds of D-50 patch settings and adjust them all from one screen slider. Such adjustments can be absolute, reflecting the value of the slider position, or relative, taking the slider position and adding or subtracting it from the current value of the setting. Furthermore, the masks used in these three systems can be independently saved to disk for later use, letting you create an extensive toolbox of specific masks for specific tasks, such as brightening, lengthening, crossfading, or otherwise manipulating sounds. This is power beyond the scope of any other synth-editing program I'm aware of. But steel yourself for learning pains.

PATCHING IT ALL TOGETHER

The kind of librarian, editor, or editor/librarian combination you choose to buy depends on just how deeply you want to get into the workings of a given synthesizer. All four of the packages covered here offer value for the money, and all four have differences that will make them appeal to slightly different audiences. D-50 owners interested in librarian features and some mild sound tweaking will find the programs from Dr. T or Valhala most satisfying. Those who need more features will lean toward Opcode and learn to find their way around a mildly complicated (but well-documented) interface. Hard-core sound creators will settle for nothing less than the power in the Beaverton package and will probably love it as much for its variations from the Mac standard as in spite of them.

And for those who own a MIDI synth other than a D-50, you should still be able to find a package that fits your needs, although your choices in variety and features may be more limited. So introduce your synth to an editor or librarian — in no time at all, they'll be making beautiful music together.

FREFF IS A COLUMNIST FOR MACUSER AND KEYBOARD MAGAZINES AND HAS BEEN INVOLVED WITH MICROCOMPUTERS IN THE ARTS FOR TEN FUN-FILLED YEARS. HE IS ALSO A SCI-FI ILLUSTRATOR, ENTREPRENEUR, AND A POLYMATH, WHICH IS A PERSON WHO KNOWS WHAT A POLYMATH IS.

MACUSER RATING

Opcode D-50 Editor/ Librarian ♪♪♪½

Follows Mac Interface	■ ■ ■ ◧ □
Printed Documentation	■ ■ ■ □ □
On-Screen Help	None
Performance	■ ■ ■ ■ □
Support	■ ■ ■ ■ □
Consumer Value	■ ■ ■ ■ □

Comments: The industry standard. **Best Features:** Comprehensive range of features, Library and Bundle files, and randomizing functions. **Worst Feature:** Screen layouts. **List Price:** $250. Published by Opcode Systems, 1024 Hamilton Court, Menlo Park, CA 94025; (415) 321-8977. Mac Plus required, hard disk recommended. Version 5.01 reviewed. Copy-protected.

MACUSER RATING

Dr. T's D-50 Editor/ Librarian ♪♪♪½

Follows Mac Interface	■ ■ ■ ■ □
Printed Documentation	■ ■ ■ □ □
On-Screen Help	None
Performance	■ ■ ■ ■ □
Support	■ ■ ■ □ □
Consumer Value	■ ■ ■ ◧ □

Comments: Solid, reliable, and almost entirely intuitive. Doesn't have as many features as others, but better at those that it does have. Comes with one bank of factory patches. **Best Features:** Clear organization and great sound auditioning. **Worst Feature:** Little in the way of patch generation. **List Price:** $175. Published by Dr. T's Music Software, 220 Boylston Street, Suite 306, Chestnut Hill, MA 02167; (617) 244-6954. Mac Plus required, hard disk recommended. Version 1.0 reviewed. Copy-protected; registered owners can get one backup copy for $15.

MACUSER RATING

Valhala D-50 Editor/ Librarian ♪♪♪

Follows Mac Interface	■ ■ ■ ■ □
Printed Documentation	■ ◧ □ □ □
On-Screen Help	None
Performance	■ ■ ◧ □ □
Support	■ ■ ■ ■ □
Consumer Value	■ ■ ■ ◧ □

Comments: Program could use a revision to clean things up. **Best Features:** Clear organization and PatchSheet editing. **Worst Feature:** Documentation. **List Price:** $129 ($3.50 shipping and handling, available only by mail). Published by Valhala Music, P.O. Box 20157-MU, Ferndale, MI 48220; (313) 548-9360. Mac Plus required, hard disk recommended. Version 1.11 reviewed. Not copy-protected.

MACUSER RATING

Beaverton D-50 Editor/ Librarian ♪♪♪

Follows Mac Interface	■ □ □ □ □
Printed Documentation	◧ □ □ □ □
On-Screen Help	None
Performance	■ ■ ■ □ □
Support	■ ■ ■ ■ □
Consumer Value	■ ■ ■ ■ ◧

Comments: The most innovative and least intuitive package available. Also the most powerful tool for creating useful new D-50 sounds. **Best Features:** Savable randomization masks, CrossTalk system, Universal Algorithmic Slider. **Worst Features:** Poor documentation, lack of adherence to Mac interface, weak graphic envelope editing, separation of program into two components. **List Price:** $199. Published by Beaverton Digital Systems, P.O. Box 1626, Beaverton, OR 97075; (503) 641-6260. Mac Plus required, hard disk recommended. Version 1.01 reviewed. Copy-protected.

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DTP

MacUser's Desktop Publishing Section

EDITED BY AILEEN ABERNATHY

Practicing What We Preach

You may be wondering, since we have a monthly section on DTP, whether *MacUser* itself has joined the ranks of the desktop published. Funny you should ask. Our goal is to produce the entire magazine from the desktop, and we are moving rapidly in that direction.

The production of a four-color magazine — whether traditional or desktop — is vastly more complicated than that of a newsletter. If you're not familiar with magazine DTP, take a look at the MacUser Labs report on databases in the December issue. "The Data Chase" was designed by Technical Art Director Michael Yapp and produced entirely on desktop except for the photographs, which were stripped into the negatives using traditional methods. The text was written in Microsoft Word 3.02 and placed in PageMaker 3.0 using predesigned style sheets. Color graphics were created in Adobe Illustrator 88 and imported to PageMaker; key lines were used to indicate the positions of photographs.

Once we were satisfied with the layout, text and graphics were separated into two files. The text elements were printed directly from PageMaker onto negative film using a Linotronic 300. The graphic elements were saved as PostScript files, their colors separated with Adobe Separator, and printed to film on the Linotronic. The printing plates were created from these films. Thus, the lab report went directly from computer desktop to film without any intermediate steps on paper (except for proofing).

As our DTP efforts progress, we'll share war stories and tips that may help your own efforts, starting with hints on doing page separations with Illustrator.

— *Aileen Abernathy*

In the Driver's Seat

Both Cricket Software and Palomar Software have announced new printer driver technologies that will allow the Macintosh to use printers other than Apple's ImageWriters and PostScript devices. Both QuickDraw-based drivers will bring some of the benefits of PostScript — such as outline fonts and rotated text — to non-PostScript printers.

Cricket will "open" the technology on its Expression line of device drivers so that any Macintosh application can access it. To date, these drivers have worked exclusively with Cricket's graphics applications. Cricket is also developing drivers for thermal color printers from Calcomp and Seiko and for the Sharp JX-730 ink-jet printer. Cricket first announced its Expression device drivers a year ago and currently markets drivers for the Hewlett-Packard PaintJet and Presentation Technologies' Montage Film Recorder. To put yourself in the driver's seat, contact Cricket Software at 40 Valley Stream Parkway, Malvern, PA 19355; (215) 251-9890.

Palomar Software and Mirus Corp., maker of the Mirus FilmPrinter, are jointly developing a competing set of printer drivers. Unlike Cricket, which markets its Expression drivers directly, Palomar's drivers will be shipped and supported by printer manufacturers who license the technology. The drivers will use URW's fonts and Nimbus scaling technology. At least four printer manufacturers have signed on to the new driver technology, with official announcements expected by January's Macworld Expo. For more information on the driver, contact Palomar Software at P.O. Box 120, Oceanside, CA 92054; (619) 721-7000.

— *Henry Bortman*

A Quick and Easy Read

When it comes to speed reading, the latest crop of Macintosh OCR products will make even an Evelyn Wood graduate jealous. The newest software and hardware is getting faster and more accurate in translating the printed page into electronic form. Three new releases stand out from the crowd.

Leading the pack is TextPert, which claims a 99.5-percent accuracy rate for both typeset and typewritten text. TextPert is learning-based, so you must spend some time teaching it the typefaces you want it to recognize. This means the program can be used with virtually any font — or even other character sets, such as Kanji (Japa-

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At the fall Seybold DTP conference, Quark managed the almost unheard-of feat of simultaneously announcing and releasing a product. This month in DTP Reviews, we take a look at QuarkStyle, along with Adobe Publishing Packs and MacGraphics. DTP Tips shows you how to create special effects in PostScript using FreeHand's UserPrep file. And finally, you'll find tips on how to achieve the best results.

If you have tips of your own to share, send them to DTP, c/o *MacUser*, 950 Tower Lane, 18th floor, Foster City, CA 94404.

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Show off your creativity with CG TYPE and FontLiner.™ Enter the CG TYPE *Excellence Contest*. Send us your hottest design—logo, ad, headline, newsletter, or brochure. Take first place and win an Agfa Focus 800 Scanner! Get your design in print, too. Photographs of the winning design and artist will appear in a future CG TYPE ad. You don't have the right tools to be a winner? We'll help you blow away the competition. Buy any CG TYPE volume for $149, and get a FontLiner utility **FREE**. A $129.95 value!

FontLiner, an exciting new program by Taylored Graphics, lets you convert CG TYPE characters into PostScript® artwork. Use that artwork instantly with either Adobe Illustrator™ or Aldus FreeHand.™ Then let your typographic creativity loose with any project, from memos to logos. So show us your stuff. Enter the CG TYPE Excellence Contest. For details, call **800-MAC-TYPE**.

CG TYPE, PostScript-compatible type for the Macintosh. In Canada, call 800-533-9795. MasterCard and VISA accepted. Free 48-hour delivery. FontLiner offer good through March 15, 1989.



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To enter the CG TYPE Excellence Contest, send your original design sample with your name, address, and telephone number to Compugraphic Corporation, Type Division, CG TYPE Support Group, 90 Industrial Way, Wilmington, MA 01887. Contest is void where prohibited by law. You must use CG TYPE and FontLiner to create your design. Limit of one entry per person. Entries must be received by March 31, 1989. Prize may not be transferred or substituted. Winner must complete an affidavit of eligibility and release from liability, and consent to use of his/her name/likeness at Compugraphic Corporation's discretion. Entries become the property of Compugraphic Corporation. Winner will be notified by registered mail. The contest is open to CG TYPE users, 18 years or older, except employees of Compugraphic Corporation and its affiliated companies. For the winner's name, send a self-addressed stamped envelope to the address above. Compugraphic is a registered trademark of Compugraphic Corporation. Macintosh is a trademark of Apple Computer, Inc. POSTSCRIPT is a registered trademark of Adobe Systems Inc. Aldus FreeHand is a trademark of Aldus Corporation. Adobe Illustrator is a trademark of Adobe Systems Inc. FontLiner is a trademark of Taylored Graphics. ITC Novarese is a registered trademark of International Typeface Corporation. All copy typeset in ITC Novarese. All type output on a Compugraphic high-resolution output device.

cgType

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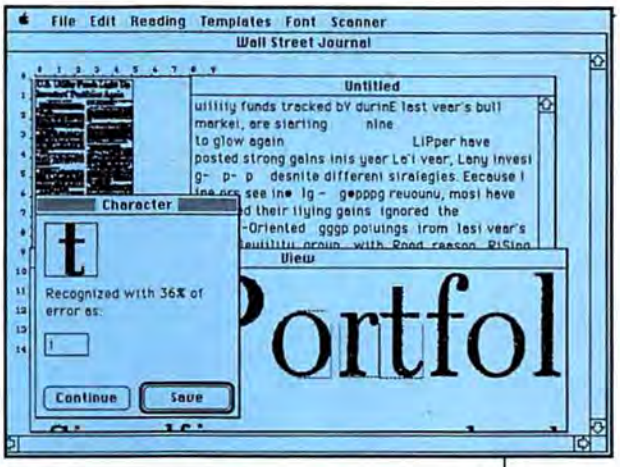
nese pictographs). TextPert automatically recognizes and retains column formatting, making it an ideal tool for forms processing. TextPert requires only 1 megabyte of RAM and sells for $995. It's available from CTA, Inc., 866 Second Ave., New York, NY 10017; (212) 759-6201.

On the hardware side is DEST's WorkLess Station II stand-alone scanner. The OCR system is geared toward high-volume processing of both typewritten and typeset material. DEST claims OCR speeds of up to 1,200 words per minute. The WorkLess Station II with a Mac interface costs $10,985. It's available from DEST, 1201 Cadillac Court, Milpitas, CA 95035; (408) 946-7100.

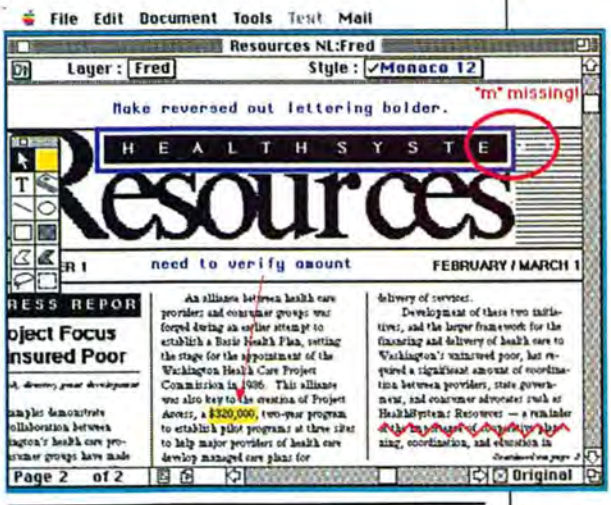
Read-It!, the low-end program that made OCR available to everyone, has gone through a major upgrade. The program now uses topological recognition — as opposed to strict matrix matching — to make for faster operation and fewer errors. The new version also supports plug-in drivers, which means that many more available scanners can talk directly to Read-It!. Version 1.0 users receive a free upgrade, which includes a new manual. Read-It! 2.0 sells for $395 and is available from Olduvai Software, 7520 Red Road, South Miami, FL 33143; (305) 665-4665, (800) 822-0772.

Look for more releases of scanning software in the not-too-distant future. Xerox has bought both Datacopy and Kurzweil and formed Xerox Imaging Systems. We will probably be seeing a transfer of their OCR technology to the Macintosh.

— Ben Templin



TextPert's Teaching mode lets you customize templates for use with a particular publication's fonts. Here TextPert is "reading" the *Wall Street Journal* with varying success.



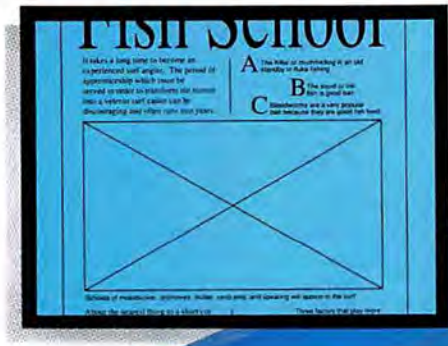
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If you're a manager or editor who's wished for a simple way to have several people review and comment on a document, Mainstay has a suitably named solution: MarkUp. This multiuser program lets your entire staff (or your bosses) make additions and corrections, or just highlight their favorite sections — all without altering the original text. You can then incorporate just the changes you want into the original document.

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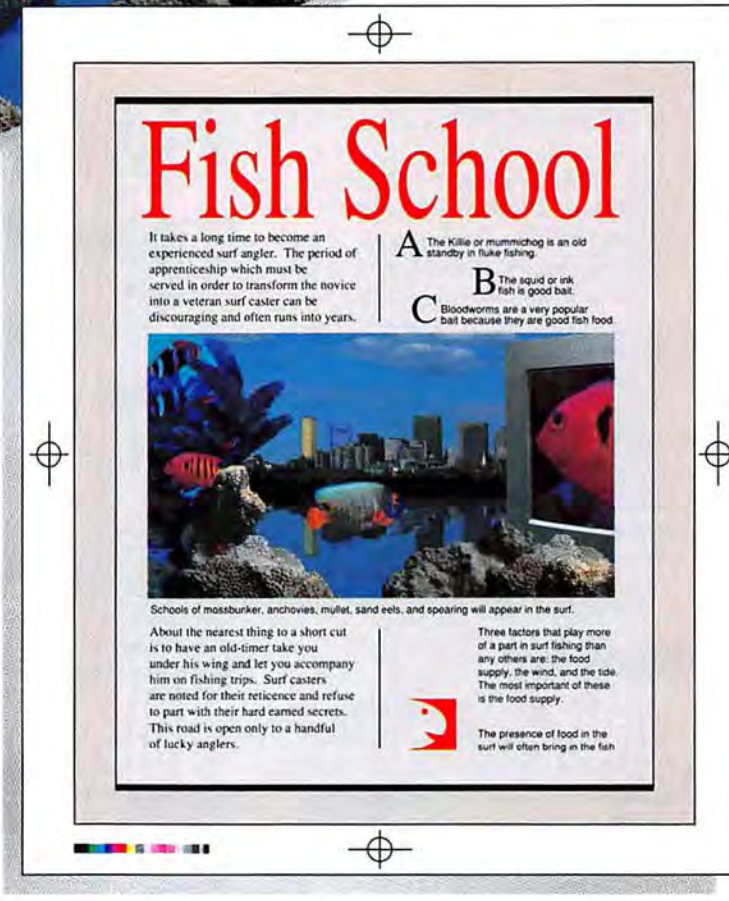
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PhotoMac

Not just pretty pictures

MarkUp has a retail price of $495 for a two-user database package and $995 for five users. Additional users can be added for $195 each. For more details, talk to Mainstay at 5311-B Derry Ave., Agoura Hills, CA 91301; (818) 991-6540.

— Aileen Abernathy

Share and Share Alike

It's not strictly a publishing application, but the Odesta Document Management Systems (ODMS) could be good news for those hardy souls trying to manage professional publishing on desktop systems. ODMS lets users organize, track, and retrieve work across networks of Macintosh and VAX computers. To accomplish this feat, it treats text, graphics, and spreadsheets as records in a database.

ODMS/DocuShare lets users on a network associate documents by type, project, category, date, or other keyword, and retrieve them quickly from a dedicated document server. The server can reside on either a Mac or VAX, and both Macs and VT terminals can access the documents.

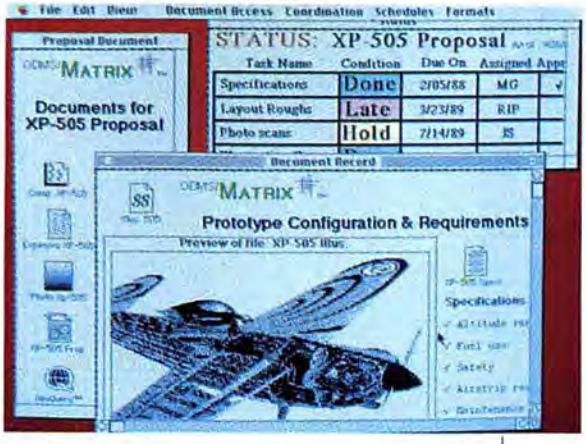
ODMS/Matrix takes this document-management process a step further. Through Matrix, managers and supervisors can track the progress of documents through the production process, from writing and editing to final layout. They can assign documents to employees and specify both the required tasks and deadlines. When a user selects a task, the appropriate document is copied from the server, and its application is launched automatically. When the document is saved, the updated copy is returned to the server, and the person who assigned the task is flagged.

ODMS/DocuShare costs $895 for the Mac and from $4,500 to $19,500 for the VAX, depending on system size. ODMS/Matrix sells for $1,995 for a Mac server and from $15,000 to $110,000 for a VAX. For more information, contact Odesta Corp. at 4084 Commercial Ave., Northbrook, IL 60062; (800) 323-5423.

— Henry Bortman

Scoop on Scoop

When we reviewed Scoop a year ago (see "Inside Scoop," February '88), it was a fledgling page-layout program with a promising future. Then its distributor, Target Software, abruptly closed up shop. For months the program remained in limbo, unsupported and seemingly without a future. But take heart, Scoop fans. The program has been rescued from the software dustbin by its developer, Lance Lewis of Foton Corp.



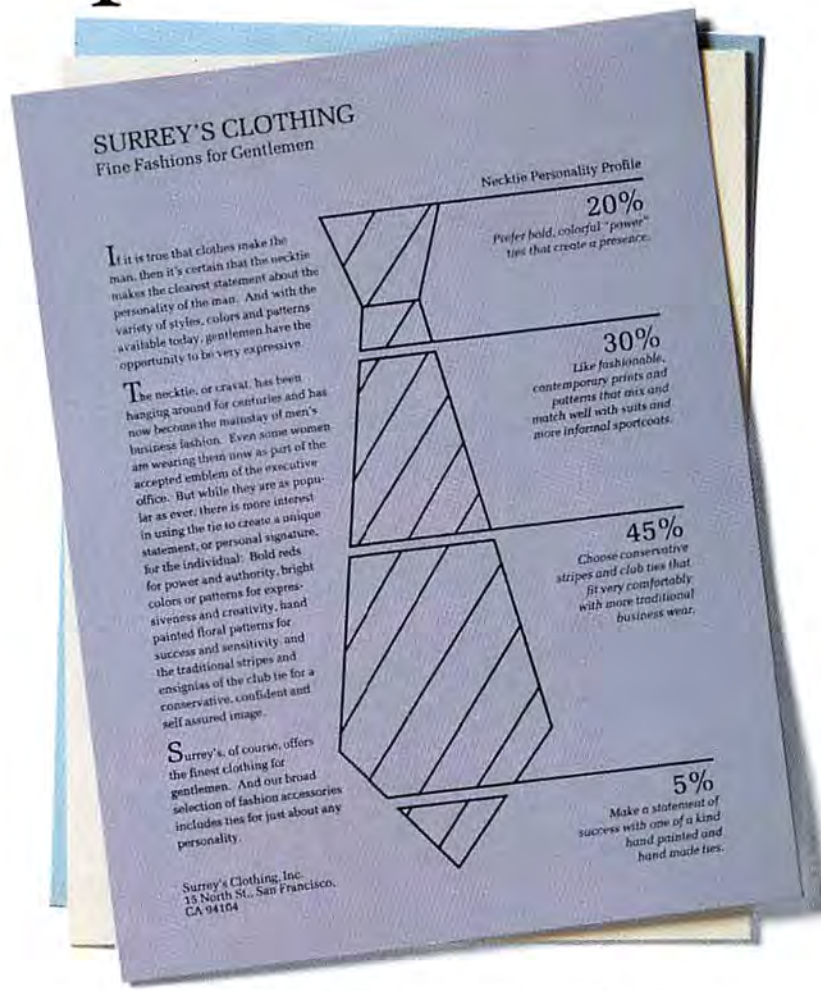
Odesta's new Matrix and DocuShare systems let you share files and track work flow across a network of Mac and VAX computers.

Unfortunately, the name *Scoop* and the documentation belong to Target, so Lewis has renamed the program *Malibu* (ugh) and can provide upgrades only to current owners (who have manuals, natch). He's putting the finishing touches on version 1.1e, which is compatible with System 6.0x and has several new features, including automatic table creation, easier placement of linked columns, improvements to the user interface, and bug fixes (the program no longer bombs unexpectedly). New keyboard equivalents for font size, kerning, and text stretching enhance the program's typographic features, which have always been its strong point.

Although Malibu's future remains uncertain, Lewis is discussing distribution rights with several publishers. Current users can receive a free upgrade to Malibu 1.1e by sending Lewis their original Scoop program disk along with a self-addressed, stamped disk mailer. If that's too tough, just send a check for $25, and you'll receive the upgrade anyway. For more information about Malibu, née Scoop, contact Lewis at Foton Corp., 5699 Kanan Road, Suite 318, Agoura Hills, CA 91301.

— Aileen Abernathy

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Kern Those Pairs

Hiding in the wings at the fall Seybold DTP conference was a new product from Pairs Software of Toronto. Pairs offers relief for those of you who are consistently disappointed with the limited set of kerned pairs built into the screen fonts that accompany Adobe's PostScript fonts. The company is creating a comprehensive kerning database for the entire Adobe typeface library. Kerning data for more than 223 typefaces has been completed thus far; in some cases, Pairs has added more than 500 kerned pairs to a typeface.

Each Pairs set installs in place of the Adobe- or Apple-supplied screen fonts and results in much tighter, more professional-looking type. Pairs sets work automatically with all software that supports Apple's standard procedures for invoking automatic kerning.

Prices range from $25 to $130 per volume, or you can obtain the entire 55-volume set for $2,453. Contact Pairs at 160 Vanderhoof Ave., Suite 201, Toronto, Ontario, Canada M4G 4B8; (416) 421-9900.

— *Henry Bortman*

Land, Ho!

Mansfield Systems is charting a new course in desktop publishing with TechScriber, the first application to focus specifically on "technical" DTP. TechScriber has seven separate components, called *lands,* that handle word processing, page layout, and document organization, as well as the creation of diagrams, tables, and mathematical equations. Output can range from a page of notes to books containing thousands of pages, and TechScriber should be especially well suited for scientific articles, manuals and theses.

PublishLand is the only required component. The rest of the real estate — TextLand, LayoutLand, StructureLand, DiagramLand, TableLand, and MathLand — can be mixed and matched as needed. A writer or scientist, for example, may need only a few lands, while a publication's editor will probably want the entire empire.

TechScriber's most innovative feature is From Within Shuttle, which lets you use Word, MacDraw, Illustrator, Excel and other programs as if they were built-in. The finished text or graphic is saved as part of your TechScriber publication.

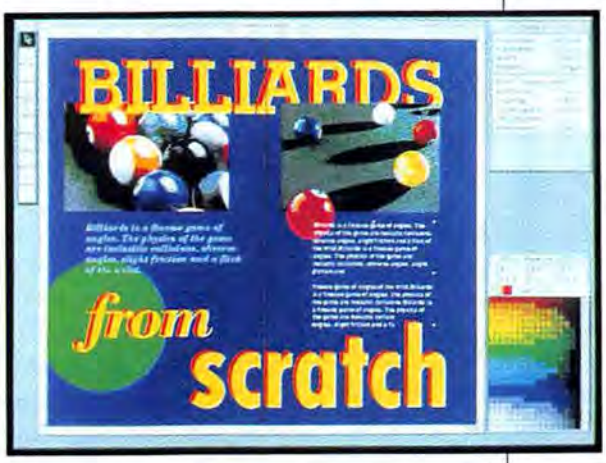
TechScriber should debut in the second quarter of '89 and will run on all Macs with 1 megabyte of RAM and a hard disk. With a total-package cost of $990, it could be a worthy competitor for the ultra–high-end Interleaf Publisher ($2,495). Lands also may be purchased individually for $95 or $195, depending on the acreage you want. For your land needs, contact Mansfield Systems at 550 Hamilton Ave., Suite 200, Palo Alto, CA 94301; (415) 326-0603.

— *Laurie Ochsner*

The Speed of Light

The Lightspeed Color Layout System has received a facelift; version 1.5 sports improved scanning capabilities and rotation and skewing of all elements. It imports PICT2 and TIFF files, and supports full PostScript output to Scitex and Hell prepress systems. Lightspeed was recently bought by Crosfield; needless to say, a Crosfield interface will appear any day now. Version 2.0 of the design and production system, expected to ship this quarter, will offer significant improvements in text handling.

Introduced a year ago, the $39,500 turnkey system includes a Mac II with 5 megabytes of RAM and a 40-megabyte hard disk, a 19-inch color monitor with graphics card, a 300-dpi color scanner, color thermal printer, Bitstream fonts, and Lightspeed's software. The system is primarily used by designers for creating layouts and producing full-color comprehen-



Version 1.5 of the Lightspeed Color Layout System features improved scanning abilities, rotation and skewing, and PostScript output to Scitex and Hell prepress systems.

Develop your ideas in Digital Darkroom.



1 *A classic arch becomes the anchor for this surreal composition. After eliminating unwanted areas, a stair-step design is added.*

2 *After being cut from its background, a skyscraper is added. A false bottom is created with simple retouching.*

3 *With the help of automated paste controls that replace tedious pixel editing, the waves wrap around the arch.*

4 *Using brightness and contrast controls, dramatic clouds are salvaged from an underexposed original and then pasted into the background.*

5 *Finally, the children step out of an otherwise ordinary photo — with the help of the Magic Wand automatic selection tool — to add the key dramatic element to the composition.*

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sives. For more information, contact Crosfield Lightspeed at 47 Farnsworth St., Boston, MA 02210; (617) 338-2173.

— Aileen Abernathy

Playing the Field

You might call them "free agents": programs that were introduced first for one computer team, the MS-DOS Commandos, and later moved to the Macintosh Iconoclasts — or vice versa.

In the footsteps of WordPerfect, PageMaker, and Excel comes Adobe Illustrator, which first joined the big leagues in early 1987 as a PostScript-based drawing program for professional artists. It was upgraded a year later to Illustrator 88. Now Adobe is cloning a new PC player, called Adobe Illustrator, Windows Version. The PC version includes some of Illustrator 88's strengths: freehand drawing, autotracing, and DXF file compatibility (for exchanging files with many CAD programs). It ships this month with a retail price of $695, $200 more than the Mac's Illustrator 88. It requires version 3.01 or later of Windows and can exchange files with Illustrator 88. For more information, get in touch with Adobe Systems Inc. at 1585 Charleston Road, Mountain View, CA 94039-7900; (415) 961-4400.

Other programs are following the opposite route, migrating from other operating systems to the Mac. Some products to watch for:

• Ventura Publisher, the leading page-layout program in the PC world, is reportedly coming to the Mac. Its reputation is based on speed and the ability to handle long documents. Xerox Corp. won't comment on the product's future, but observers say the Mac version should be announced any day now. Xerox Corp. is located at 9745 Business Park Ave., San Diego, CA 92131; (619) 695-7700.

• VideoShow is a combined hardware and software system from General Parametrics that produces slide and video presentations. The Mac version has a March shipping date. Its pricing will be roughly comparable to the PC version's, which ranges from $2,995 to $8,995. You'll find General Parametrics Corp. at 1250 Ninth St., Berkeley, CA 94710; (415) 524-3950.

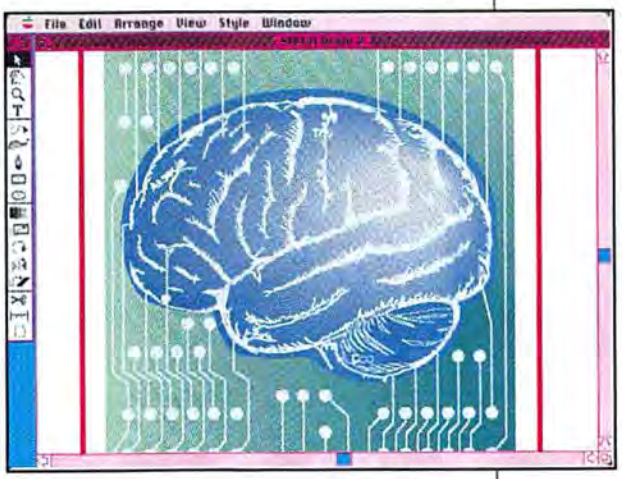
• Publishing Partner Professional, a page-layout program from Soft-Logik Publishing, is now running on the Atari but is being ported to the Mac and Commodore Amiga. It features integrated graphics, word processing, and typographic controls. The Mac version will support color, including the ability to produce four-color separations. It's expected to ship by June for an undisclosed price. For more information, contact Soft-Logik Publishing Corp., 11131F South Towne Square, St. Louis, MO; (314) 894-8608.

• CorrecText, from Houghton Mifflin, is being ported from DEC computers. CorrecText identifies incorrect grammatical constructions, suggests changes, and provides contextual grammar lessons. It's expected to be bundled with another product and released in the latter half of 1989. Houghton Mifflin Co. is located at 1 Beacon St., Boston, MA 02108; (617) 725-5000.

• A program coming to the Mac from Sun workstations is FrameMaker from Frame Technology. FrameMaker is a high-end document processor similar to Interleaf Publisher that's expected to be released in spring '89. Pricing is still undecided. You can reach Frame Technology Corp. at 2911 Zanker Road, San Jose, CA 95134; (408) 433-3311.

If enough of these free agents are developed, users may be able to put together an all-star team of applications that will work on the computer of their choice.

— Gil Davis



Adobe Illustrator is turning Blue — the PC version, due out any day, includes popular features like freehand drawing and autotracing.

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DTP

A Touch of Gray

Tired of seeing the world in black and white? This primer on digital halftones will help you add a touch of gray to your publication.

You've just bought a nifty gray-scale scanner. You aren't quite sure what *gray scale* means, but the salesperson at the computer store said the scanner will let you produce high-quality photographs with your desktop-publishing system. Being a trusting soul, you plunked down $3,000 for a device that promises to spice up your magazine or newsletter with flashy graphics. You set up the hardware, scan in your favorite photograph, maybe enlarge or reduce it a little, and print it out on your laser printer. What emerges looks like something you'd watch out for in a cow pasture.

Desktop publishers everywhere are clam-

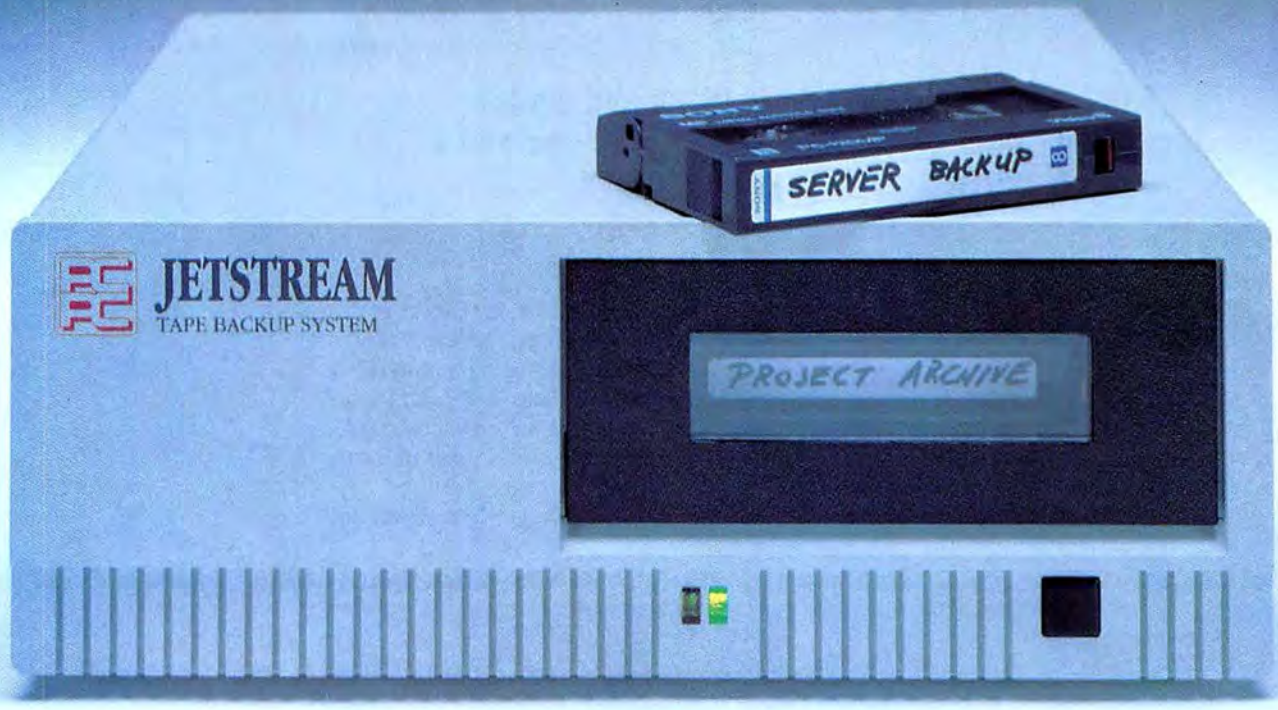


Figure 1: A conventional halftone (left) uses varying dot sizes to simulate different gray levels. Since laser printers have a fixed dot (or spot) size, a digital halftone (right) usually doesn't display the same clarity and detail.

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BY STEPHEN BEALE, JAMES CAVUOTO, AND AILEEN ABERNATHY

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oring for ways to incorporate quality photographs into their publications, just like those they see in mass-market magazines and newspapers. But until recently, photographs and DTP were like oil and water — they just didn't mix. You could design a publication with high-tech software, but you had to leave empty boxes where the photos should go. After printing the final pages, you would bundle them with the photos and send everything to the print shop, where the photos would be converted to halftones and manually stripped into the boxes. The resulting quality was good, but the advantages of desktop publishing — having control over your publications and seeing on-screen just how they will look — were diminished.

The advent of gray-scale scanners gives us the ability to add quality photographs to our publications from the electronic desktop. But the real impact of gray scale is seen at the output end, in the pages that roll out of laser printers and high-resolution imagesetters. A better understanding of the process by which gray-scale images are scanned, manipulated, and printed will help you improve image quality and impress your readers.

The Old-Fashioned Way

What do we mean by *gray scale?* Look at a black-and-white photograph, and you'll notice little that is actually black or white. Most objects contain varying shades of gray that provide detail and contrast. In general, the more shades of gray an image has, the more realistic it looks. A photograph is called a *continuous-tone image* because it has an unbroken, nearly infinite range of gray levels between black and white.

A printing press has only one color of ink — black — so it can't directly reproduce a continuous-tone image. To see what would happen if you tried, photocopy a black-and-white photo. All the gray tones will drop out, leaving blotchy silhouettes. This process, called *posterization,* may be fine for special effects, but it won't provide realistic photographs for your publication.

This is why published photos must first be converted to halftones. A *halftone* is basically a photograph of a photograph, shot through a fine screen (see Figure 1). The screen breaks the image up into a grid of evenly spaced dots. Multiple gray levels are simulated by variations in the size of these halftone dots. If you look at a photographic

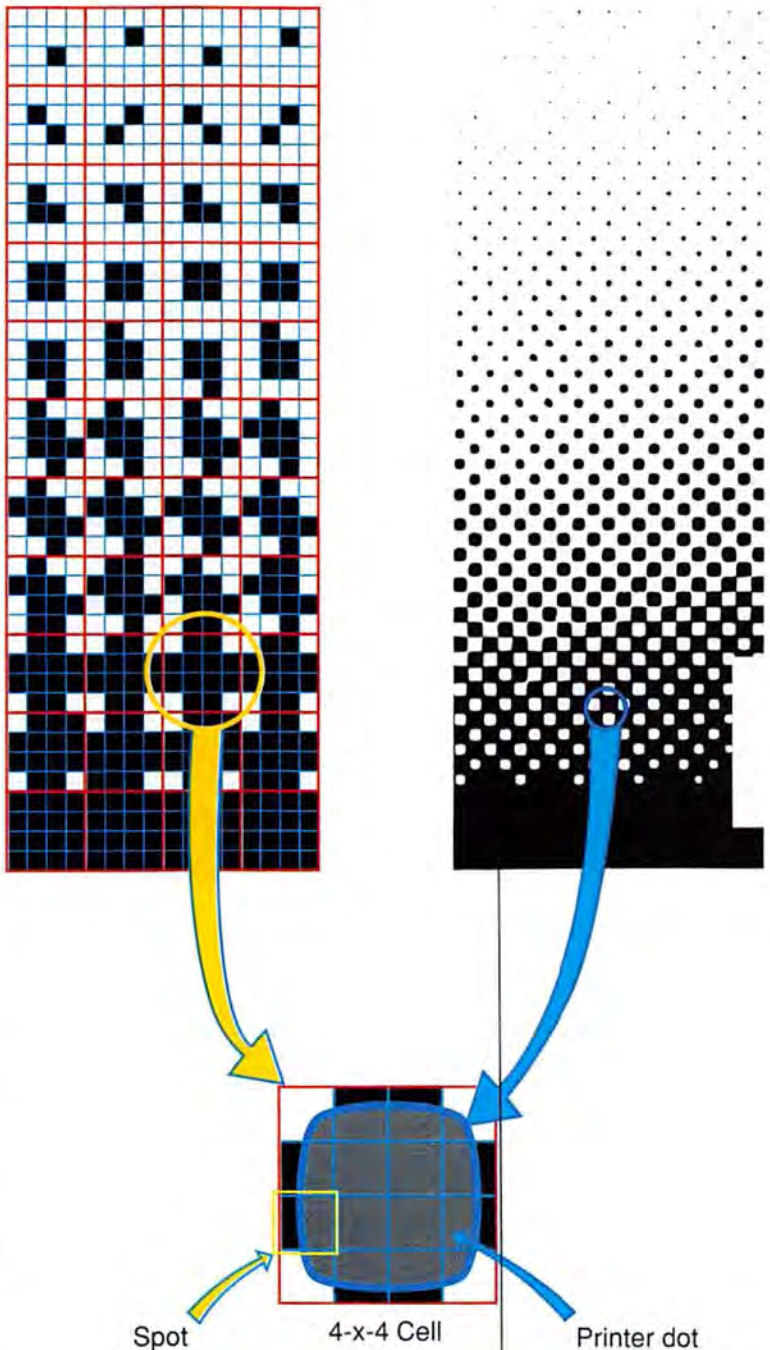


Figure 2: Digital and traditional halftones differ in how they produce multiple levels of gray. A traditional halftone achieves nearly continuous gray tones by varying the size of its component dots. A laser printer can only produce spots of one size, however, so a digital halftone is created by grouping these spots into cells. Each cell equals one traditional halftone dot. The more spots that are turned on (black) within a cell, the darker the gray. The number of grays that can be represented is limited by the number of spots within the cell. Each 4-x-4 halftone cell shown above can mimic up to 16 shades of gray.

halftone through a magnifying glass, you'll see that a dark area has many large dots, while light areas have much smaller dots. To the unaided eye, the dots blend into continuous shades of gray, looking much like the original photograph.

The sharpness of a halftone — its *resolution* — is determined by how closely spaced the dots are. If the screen through which the photograph was shot has 75 lines of dots per inch, the resulting halftone has a *screen frequency* of 75 lines per inch (lpi). Newspaper photos typically have 65- or 85-line screens, and the halftone dots are visible to the naked eye. Magazines use higher quality paper and shoot halftones with 133- or 150-line screens, providing realistic-looking photographs with no discernible dots.

Digitally Speaking

You may be thinking: Since most desktop scanners and laser printers have resolutions of 300 dots per inch (dpi), they should have no problem rendering halftones with 85- or 150-line screens. All you have to do is scan the image and print it out, right?

Wrong. A laser printer's dots are not the same as halftone dots. Laser printer dots — which we'll call *spots* (as Adobe does) to avoid confusion — have a fixed size. Since true halftones consist of varying dot sizes, laser printers must "cheat" to get the same kind of output. PostScript (the language your Mac uses to communicate with printers) creates digital halftones using a technique called *dithering.*

In digital halftones, two or more spots are grouped into a cluster called a halftone *cell,* which simulates a single dot of a photographic halftone. One cell of a digital halftone might consist of 16 spots in a 4-x-4 array (see Figure 2). Through dithering — turning various combinations of spots on (black) or off (white) — this cell could approximate 16 different shades of gray (plus white). If all spots are black, the halftone cell is black. If 12 spots are black, the cell appears dark gray. If four spots are black, it mimics light gray.

A total of 16 gray levels fall far short of continuous tone, however. Unfortunately, enlarging the halftone cell — say to 8 x 8, which gives 64 gray levels — creates another problem. The more gray levels you have, the poorer the resolution (see Figure 3). If you have a laser printer that produces 300 dots (or spots) per inch and you use a 4-x-4 array for each halftone cell, the effective resolution is cut to 75 cells per inch, equivalent to a 75-line halftone screen. (Divide 300 dpi by the 4 spots per line of a cell and you get 75 cells per inch.)

This approaches the resolution of a newspaper photograph, but 16 grays don't permit the fine shading needed for realistic reproduction. Many areas will have distinct bands instead of smooth transitions between gray levels. On the other hand, increasing the number of gray levels to 64, the minimum required for newspaper reproduction, cuts effective resolution to an unusable 37.5 cells per inch.

In short, there's a trade-off between gray levels and resolution, and you will always have to compromise in a 300-dpi environment.

High-Powered Printing

It might seem as if we've run into a technological barrier that prevents us from producing quality halftones via desktop publishing. Fortunately, we aren't limited to the 300-dpi output of the LaserWriter. Any program that uses PostScript — including PageMaker, Ready,Set,Go!, and Quark·X·Press — can communicate with high-resolution imagesetters like the Linotronic 100 or 300.

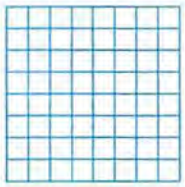
Linotype has long been the sole provider of high-resolution PostScript imagesetters. However, Compugraphic, Varityper, and Monotype have now entered the market (see Between the Lines, January '88). In response, Linotype has replaced its 1,270-dpi Linotronic 100 with the 200P, which offers increased speed and resolution.

Linotronics can print text or graphics with resolutions up to 1,693 dpi (the 200P) or 2,540 dpi (the L300). At $29,000 to $65,000, they are well beyond the reach of most desktop publishers, but many service bureaus have Linotronics and will let you generate pages for reasonable fees (see "Setting Up Shop," October '88). With a 2,540-dpi Linotronic, you can designate a 16-x-16 halftone cell (256 gray levels) and still get the equivalent of a 150-line screen. Thus, you have the best of both worlds: magazine-quality resolution and the semblance of continuous gray tones.

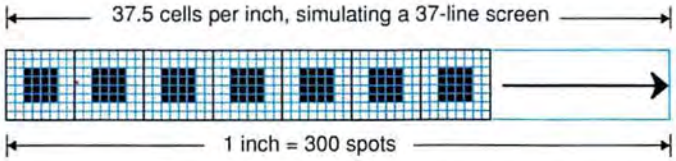
Scanning Prospects

What about the input end of things? Early desktop scanners couldn't transmit grayscale information from scanned images. They used only 1 bit of digital data to de-

Resolution versus Gray Scale



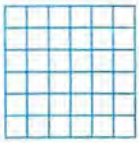
An 8-x-8 cell has 64 spots and thus can show 64 gray levels.



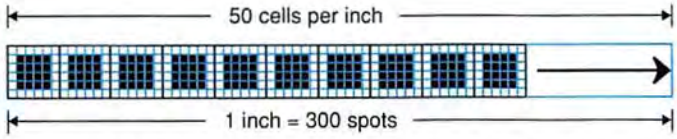
On a 300-dpi laser printer, you can't have both high resolution and continuous gray tones. You can achieve 64 grays with these 8-x-8 cells, but only 37.5 of them will fit in an inch, which means the image loses fine details (300 ÷ 8 = 37.5).



37 lpi, 64 grays



A 6-x-6 cell can display 36 gray levels.



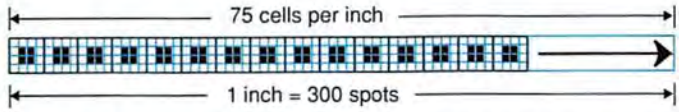
An inch can hold 50 smaller 6-x-6 cells (300 ÷ 6 = 50). This 50-line resolution, which displays 36 gray levels, may be a reasonable compromise in many situations.



50 lpi, 36 grays



A 4-x-4 cell can show only 16 gray levels.



Using 4-x-4 cells improves image resolution to 75 cells (or lines) per inch, but only 16 grays can be shown, resulting in banding and abrupt transitions (300 ÷ 4 = 75).



75 lpi, 16 grays

An 8-x-8 cell at 1,270 spots per inch.

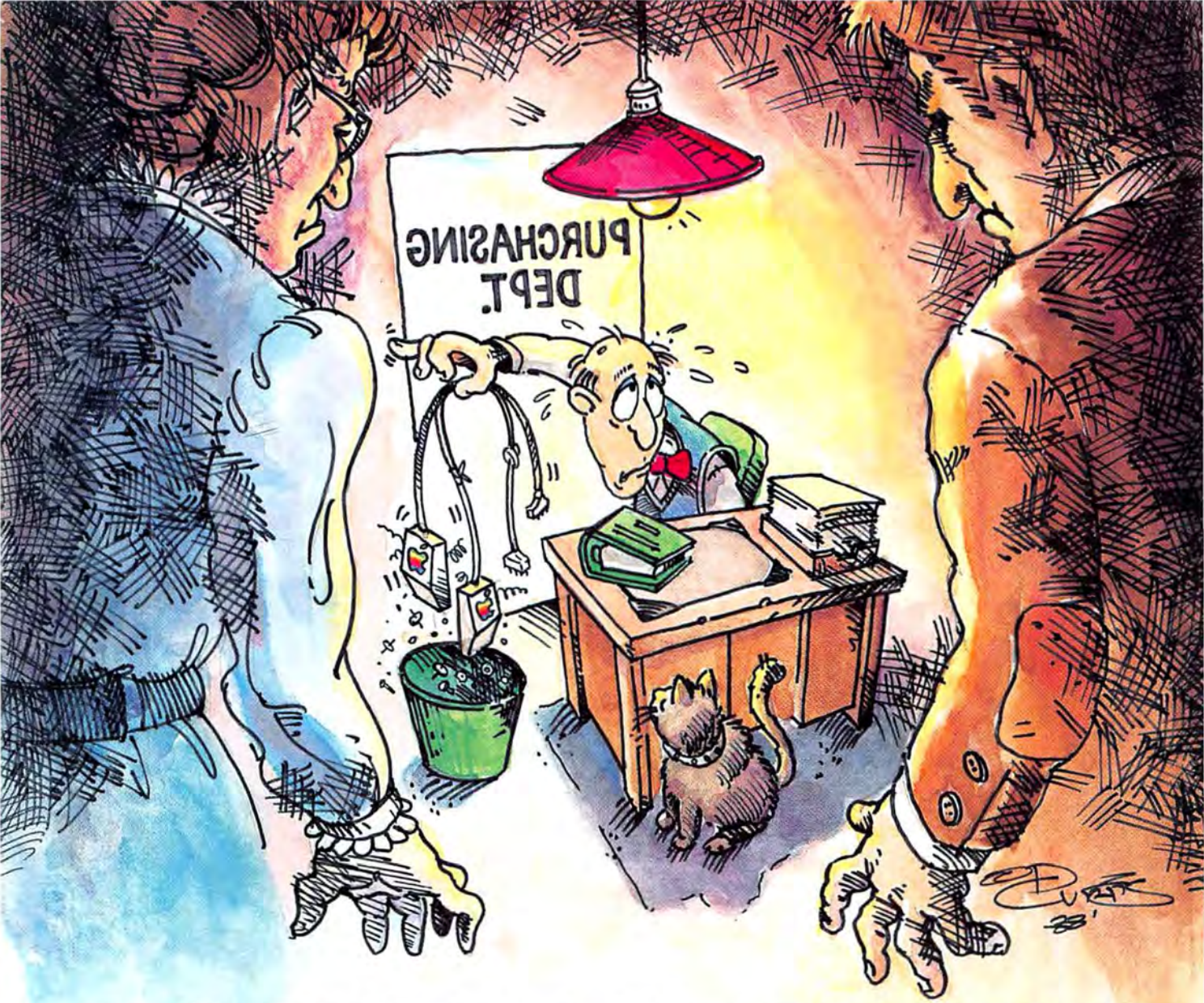


No trade-offs are needed on an imagesetter like the Linotronic, which can print 1,270 spots per inch. You still have more than 64 grays with a 133-line screen, since up to 159 cells of the 8-x-8 variety will fit in a single inch. However, you may have to adjust contrast and lightness, since the Linotronic tends to darken images.



133 lpi, 92 grays

Figure 3.



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Halftoning Hints

- In general, the scanning rate for gray-scale images shouldn't exceed your expected screen frequency. For example, if you plan to use a 150-line halftone screen, it's pointless to scan the photo at 300 dpi, since the printer will just discard the extra information. There are a couple of exceptions: Scaled images and those with strong diagonal lines may appear sharper (have fewer "jaggies") if you scan at up to twice the output rate.
- Keep in mind that the printer can't produce more gray levels than are contained in the original scanned image. That is, if you scan an image at 6 bits (64 gray levels), you can't print it with 256 grays.
- Photographs with fine detail but little variation in tone look best printed at a higher resolution and lower number of grays. A little experimenting will help you determine the best resolution/gray-scale trade-off for a particular image. A handy formula for calculating the trade-off is $1 + (A/B)^2$, where A is the printer's resolution in dots per inch and B is the screen frequency. If you print a 75-dpi halftone on a 300-dpi LaserWriter, you can get $1 + (300/75)^2$, or 17 shades of gray (white plus 16 grays).
- Even though a LaserWriter and Linotronic can print the same PostScript files, the output is not always identical. A 10-percent gray shade on a Linotronic looks much darker on a LaserWriter, while a darker shade, like 80-percent gray, looks darker on the imagesetter. If you plan to print an image with many dark areas on a Linotronic, you may want to use the lightness and contrast functions of your software to adjust the image accordingly. Remember, the engine in the LaserWriter II prints darker blacks than the engine in the LaserWriter Plus.
- Some offset-printing processes, and photocopiers as well, produce images somewhat darker than the original. Check with your printer, and if it turns out that the images will print darker, you may want to lighten them as described above.
- If the printed image has a distracting crosshatch pattern, or *moiré*, you probably screened an image that had already been screened (for example, scanning an image from a magazine rather than from an original photograph). If you are using a high-resolution printer like the Linotronic, try changing the screen angle in 1- or 2-point increments until the moiré is minimized. (Screen angle/frequency combinations are too limited on 300-dpi printers for this to work.)

scribe each pixel (picture element, the smallest area the scanner "sees"), so everything was either black or white. Some scanner models could sense variations in gray scale and compensated by performing the dithering process at the input end, amassing pixels into halftone cells that were stored as bit-mapped images. The scaling options for such images are limited, however, since the dither pattern created during scanning is optimized for the original image size. You can halve or double the size of the dithered photo without degrading image quality. Likewise for 25 percent or 400 percent. But choose any other increment — say, 73 percent of original size — and you wind up with unsightly blemishes called *moiré* patterns (see Figure 4). Dithering on input also locks the image into a particular resolution. It looks essentially the same on a 2,540-dpi Linotronic or a 300-dpi LaserWriter.

Gray-scale scanners currently on the market can store gray-scale information about each pixel. Some record four bits of information per pixel, meaning the pixel can be one of 16 shades of gray. Scanners capable of storing 8 bits per pixel can render images with 256 gray levels. (To figure



Figure 4: Distracting moiré patterns can result from resizing a scanned image that was dithered on input, or from using a halftone screen on an image that was previously screened (a magazine photo, for example).

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the number of gray shades, raise 2 to the nth power, where *n* equals the number of bits per pixel. Thus, a 6-bit-per-pixel scanner can render images with 2 x 2 x 2 x 2 x 2 x 2, or 64, levels of gray.) In most cases, these images will be stored in TIFF (tag image file format). Be forewarned: These are very large files.

The Right Angles

Once you've scanned a gray-scale image, you may want to retouch it before popping it into a page-layout program and printing. Several programs — including PageMaker 3.0, QuarkXPress 2.0, Digital Darkroom, ImageStudio, and MacImage — let you enhance the quality of halftones, even on a laser printer. For example, you can adjust the image's contrast and lightness (see Figure 5). Besides choosing the screen frequency, you can select the screen's angle and pattern.

Screen angle refers to the orientation of the halftone screen, measured from the vertical. The most common screen angle is 45 degrees, which produces the best visual results. Although you can specify any screen angle and frequency you want, the printer may not give it to you. Why? Because only certain frequencies and angles are mathematically possible. In fact, in a 300-dpi environment, there are only 21 frequency/angle combinations possible in a frequency range of 50 to 150 lpi (see Figure 6). Pick any other combination, and PostScript will simply convert it to the closest available setting.

For example, although the LaserWriter's stated defaults are 45 degrees and 60 lpi, this combination is not actually available. With a 45-degree angle, the true default is 53 lpi.

Screen angle also affects cell size and, consequently, the number of gray levels that can be represented. A 5-x-5 cell, for example, can display 25 grays in its square (0-degree) form. Tilt it at a 45-degree angle, however, and the cell grows to 32 spots — more grays to play with. At 26 degrees, the cell contains only 20 spots, with a corresponding drop in gray levels.

Some programs let you select a *screen pattern,* which determines the shape of the halftone cells. The standard pattern is a circular dot shape, but interesting results can be obtained with screens composed of lines, squares, or ellipses. In each case, PostScript creates the desired effect by altering the order in which the spots are turned on within the halftone cells.



Figure 5: PageMaker's Image Control dialog box lets you adjust contrast and lightness. For printing, you can select the angle, frequency, and shape (dot or line) of the halftone screen.

Choose Your Partner

A few programs go beyond the basics, providing extensive control over gray-scale output. MacImage, the scanning software that comes with Datacopy scanners, has contrast controls that let you enhance selected portions of an image and use gamma-correction to fine-tune dark areas. MacImage also provides a wide range of dither patterns for output. For example, you can actually determine the pattern of spots within a halftone cell, which is useful for producing special effects. Of course, you will rarely print directly from a program like this or deal with dithering until you're ready to print.

Silicon Beach Software's Digital Darkroom and Letraset USA's ImageStudio were created specifically for gray-scale editing. Both have sophisticated features for manipulating gray-scale images. The finished products can be immediately printed as halftones or exported to page-layout programs. Digital Darkroom offers Advanced Halftoning, a unique dithering feature that randomizes the spot pattern and provides superior output on a 300-dpi laser printer (see Figure 7). Instead of grouping spots into halftone cells, the program evenly distributes them throughout a gray level. If a particular object is 30 percent gray, 30 percent of the dots will be black. The resulting image has a greater range of grays — especially lighter tones — and sharper details. Digital Darkroom's manual has an ex-

Actual Freq.	Approx. Angle	Spots/ Cell
47	19	40
47	39	41
49	10	37
50	0	36
51	30	34
53	**45**	**32**
56	21	29
59	11	26
60	0	25
60	37	25
67	26	20
71	**45**	**18**
73	14	17
75	0	16
83	34	13
95	20	10
100	0	9
106	**45**	**8**
134	27	5
150	0	4
212	**45**	**2**

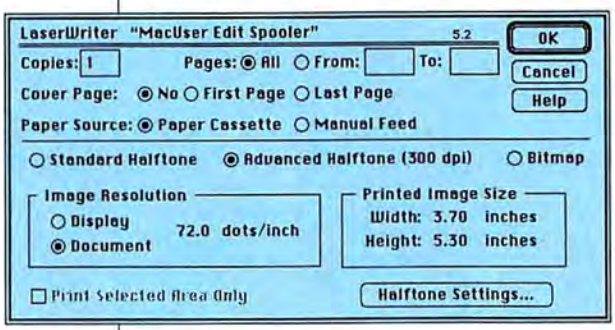
Figure 6: This chart shows the 21 screen frequency/angle combinations possible on a 300-dpi laser printer. A 45-degree angle provides the best results, followed by 0 degrees. Use other angles sparingly, as they usually produce output of lesser quality. Although this chart covers screen frequencies between 50 and 150, the upper limit for usable output on a laser printer is around 75 lpi.

cellent section on halftones, with lucid explanations and great illustrations.

Future Shock

Emerging printer technologies offer new solutions to the gray-scale challenge. Rather than relying on expensive, high-resolution approaches, these techniques simulate gray scale in other ways.

DP-Tek's LaserPort, an $895 printer controller for Hewlett-Packard LaserJet printers, creates up to 36 grays by working in conjunction with the native controller to produce 70-, 85-, and 100-line halftones. LaserPort breaks the rules of how to drive the Canon SX engine inside the printer, en-



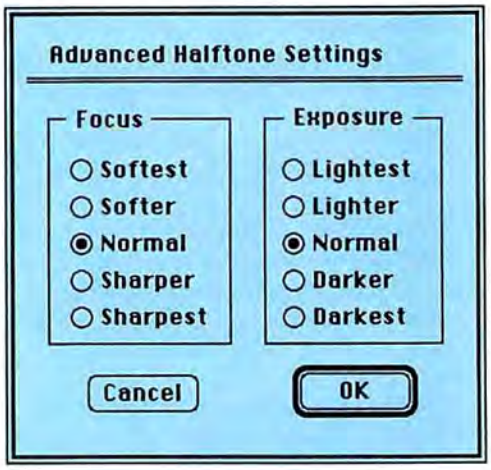
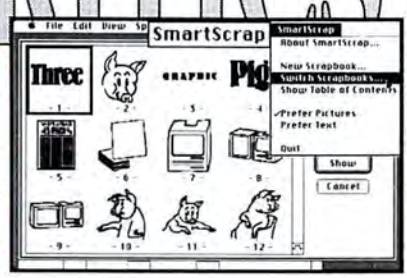


Figure 7: Digital Darkroom improves output on a 300-dpi printer through Advanced Halftoning, which randomizes the spot pattern and provides greater clarity and variation in gray levels.

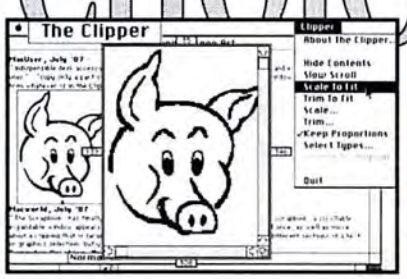
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abling it to vary spot size in increments as small as 1/1,200 of an inch. DP-Tek (Wichita, Kan.) recently announced LaserPort Gray Scale, a controller capable of producing 212-line screens and 256 grays.

A more direct approach would be a laser printer capable of varying the spot size itself, without external help. Lasermetrics, a New Jersey manufacturer of infrared lasers, has developed the technology to do this and has licensed it to Half Tone Management, Inc., which in turn is negotiating with three laser-printer companies. The new device may also be used in color laser printers and laser platemakers.

Another technique under development would allow for differing resolution/gray-scale trade-offs within the same image. Areas of constant gray, such as background, might be printed at 133 or 150 lpi, while transition regions could be rendered at 75 or 80 lpi, allowing for greater local variation in gray levels.

A third approach would be a printer that can actually vary the intensity of gray within each spot of a halftone cell. Seikosha (Mahwah, N.J.) already makes a $6,000 thermal printer for medical and industrial markets that prints 300 dpi with up to 64 gray levels per spot. By adding a special interface kit, the VP-3500 can be used with some microcomputers. Such a printer can render high-quality text and line art in addition to halftones, since its gray-scale capability lets it smooth out the "jaggies" that often appear in diagonal lines.

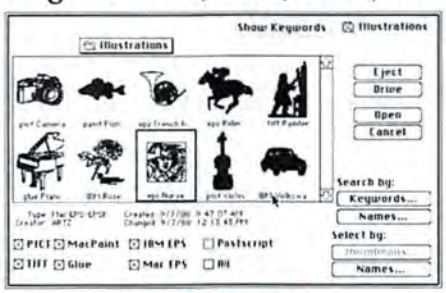
The quality of output and its reproducibility are still question marks for some of these technologies. But once the kinks are ironed out and the new devices reach the market, they will break yet another barrier to professional-quality publishing on the desktop. The process begins on the input side, but the important part is what comes out at the end.

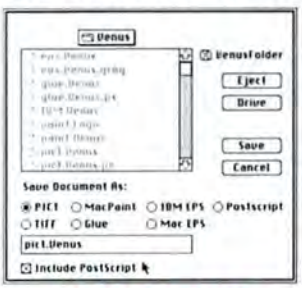
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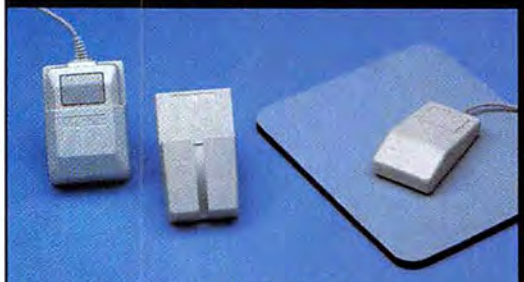
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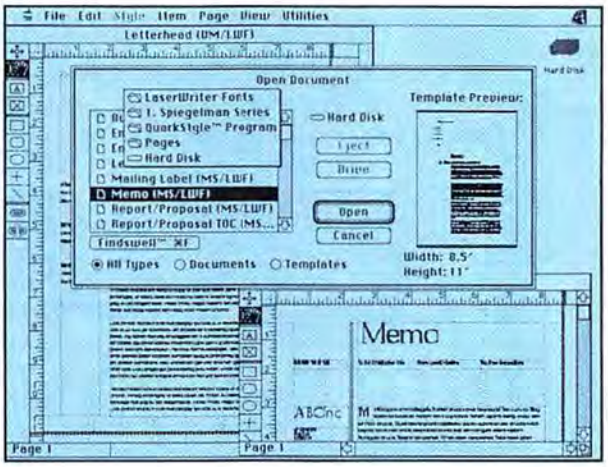
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QuarkStyle



QuarkStyle lets you open several templates at once, and you can preview individual templates — which carry their designers' initials — ahead of time.

Didn't Steve Jobs crack wise about "designer memos" way back when desktop publishing got started? Well, it's happened. QuarkStyle — an inexpensive, scaled-down version of QuarkXPress — comes complete with 72 templates and accompanying style sheets ready for your immortal words and pictures. Among the templates are no less than five professionally designed memo formats.

The idea here is "instant publishing." QuarkStyle is supposedly for those who don't know — and don't want to know — the finer points of design and layout. In theory, all you do is pour your words and pictures in, and professional-looking stuff comes out.

There are templates for letterheads, reports, proposals, mailing labels, invoices, purchase orders, hourly billing forms, fax forms, calendars, display ads, invitations, business cards, books, magazines, catalogs, newsletters... whew! They really cover the gamut. Eight well-known designers — including Roger Black, Stephen Doyle, Douglas May, and Marjorie Spiegelman — created the templates. The latter three provide complete series of documents with matching designs. Most templates have two versions, one using LaserWriter Plus fonts and the other using "Designer" faces from the Adobe Type Library.

The templates are divided into folders in a logical manner, and you can even see a thumbnail of a template in the Open dialog to make sure it's the one you're after. Be forewarned: All 80+ files are locked, so if you put them on your hard disk and later decide to remove them, you'll have to open multitudinous folders and unlock the files one at a time before throwing them away.

QuarkStyle comes with three manuals: a user guide/tutorial, reference manual, and template guide. The most obvious omission in the documentation is a detailed discussion of style sheets — the heart and soul of this program (it is named QuarkStyle, isn't it?). The reference manual devotes less than a page to styles. The template guide tells you if styles are included in a template but doesn't list them or discuss their attributes. And you can't print out style sheets from QuarkStyle. In addition, a chapter on typography and design espouses techniques possible only with QuarkXPress.

Even with templates and style sheets, the real question is whether instant publishing is actually possible. Every person's needs are different, and you may become frustrated with these canned templates. The abstract for a report may not fit in the space allotted, requiring a major design change. Advertisements are even more specialized. Thus, you will find yourself doing some design work after all. There's also the question of utility. Do you really need a template for phone messages (it looks just like the ones you buy at office supply stores) or for fax forms?

When you bag the instant-publishing rhetoric and view QuarkStyle as an inexpensive page-makeup program, it becomes more attractive. While it's missing several of XPress' sophisticated features, it provides most of the tools that the average business user needs. It imports text from most word processors and handles nearly all graphics formats. As with QuarkXPress, you can create text and graphics frames (if you don't like those provided with the templates), link frames for automatic text flow, and then fill them with text and graphics. Text automatically wraps around frames or irregularly shaped graphics. You can cut and paste page elements, adjust fills and borders, and do most other page-layout basics. QuarkStyle's word processor is adequate, with search-and-replace, automatic hyphenation, and a spelling checker. Finished documents can be output on any PostScript printer or an ImageWriter.

QuarkStyle

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Published by: Quark, Inc., 1983 Landings Drive, Mountain View, CA 94043; (415) 967-6796.
Version: 1.0
Requires: 1 megabyte and a hard-disk drive, System 4.2 or greater, LaserWriter driver 5.0 or greater.
Compatibility: Mac II and MultiFinder friendly.
Application Size: 992K
Copy Protection: None

QuarkStyle is much leaner than big sister QuarkXPress, but Quark has chosen sensibly which features to omit. There's no color of any kind, but gray shading for frames, borders, lines, and type is available. Lines are limited to seven widths, and there are no arrows or dashed lines. As for typographics, you can't adjust horizontal scaling to condense or extend type, and there's no way to track or kern to adjust the space between letters, although automatic kerning does work. Also missing is the control over hyphenation and justification parameters. Unfortunately, some of the template styles use tracking and

horizontal scaling, so if you want to alter those attributes, you will need QuarkXPress.

For occasional page makers, none of the above is a must-have feature. Style files are compatible with QuarkXPress and vice versa, so if you find yourself limited, you can buy QuarkXPress and fine-tune your QuarkStyle documents.

With its low price, QuarkStyle is a winner. It's like QuarkXPress with short menus and a shorter price tag. But don't buy it planning on instant publishing.

— *Stephen F. Roth*

Adobe Publishing Packs

Adobe makes great typefaces. Let's face it: If you want the best, you'll eventually have to go shopping at Adobe's foundry. But its type products are expensive, ranging from $185 to well over $300 for the most desirable typeface families.

There is a cost-effective way to build your typeface collection, however, if you are willing to accept Adobe's word on what constitutes the proper set of typefaces for a specific DTP project. The company is now bundling three typeface families together in so-called Publishing Packs at a substantially lower price than the faces would cost individually.

The first collection, Newsletters, provides you with three typefaces thought appropriate for newsletters: Century Old Style, ITC Franklin Gothic, and ITC Galliard. The second pack, Forms & Schedules, contains three families that look good on forms: Lucida, News Gothic, and Univers. The third selection, Presentations, consists of faces suitable for overheads and flip charts: Helvetica Condensed, ITC Lubalin Graph, and ITC New Baskerville. Each trio includes all the variations of the given typeface (such as bold and italic) in a package that contains screen fonts, printer fonts, Adobe's downloader application, and AFM files. You also receive handy sample printouts of the character sets for each font.

The ads for these packages sport the words "How to use type like an expert" emblazoned across the top. This is a bit of an exaggeration. The Publishing Packs do include pamphlets (that fold out to the awkward size of newspapers) featuring a well-known typographer or designer. But the people who think these booklets really teach you how to produce effective newsletters are probably the same ones that find the new look of *Publish!* attractive.

It's not that there aren't interesting tips and tidbits here — just don't expect too much. A fairly common misconception is that these collections contain templates or detailed advice on producing various kinds of typeset material. They don't. But the pamphlets, especially the one focusing on Roger Black and newsletters, do make for a good read. They are, in turns, urbane, witty, and chatty. One of their nicest features is a section pointing out the distinguishing marks of each typeface in the pack. This helps you become better acquainted with the typefaces — from the slight flare on the stem of the *a* in ITC Franklin Gothic to the saucy impertinence of the splayed italic *Y* of ITC Galliard. It's a welcome way to hone a skill often lacking among DTP'ers.

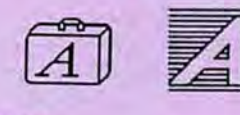
In the end, the main attraction of these packages is not the documentation or the enclosed opinions of publishing gurus — it's a simple case of "the price is right." You'd pay more — 30 percent more — if you bought the bundled typefaces separately.

Saving money is nice, but there's a downside. You pay a price for the pack discount: You lose freedom of choice. So, if you're so cheeky as to disagree with ITC's Allan Haley on what constitutes a proper mixture of typefaces for presentations, you'd better have the bucks to pay full price for your own selection. It might make more sense if Adobe provided similar savings to anyone who bought three typefaces at one time.

If you don't know much about typefaces and just want a good-looking mix of type for your particular purposes, by all means buy the Publishing Packs. And shop around, because the packs are discounted up to 25 percent by many mail-order companies and soft-

Adobe Publishing Packs

★★★½



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Forms & Schedules	Lucida, News Gothic, Univers	$475	$740
Presentations	Helvetica Condensed, ITC Lubalin Graph, ITC New Baskerville	$475	$740

Adobe Publishing Packs can save you money when you're building your PostScript typeface collection. The "Pack Price" column indicates the retail price of each bundled group of typefaces. "Typefaces Price" shows the collective cost of the typefaces if purchased separately.

ware outlets. But if you stubbornly insist on your own selection of typefaces despite all the advertising hype, take heart. By buying a different triad of Adobe typefaces through discount houses or low-cost software retailers, you can almost match the lower cost of Adobe's pack deals. You'll end up paying a few dollars more, but you might gain in the long run by being able to purchase the faces *you* think are best for the job at hand.

— Gregory Wasson

MacGraphics

MacGraphics



List Price: $225
Published by: GoldMind Publishing, 12155 Magnolia Ave., Suite 3-B, Riverside, CA 92503; (714) 785-8685.
Version: 3.0
Requires: 800K disk drive and paint or page-layout program that opens bit-mapped images.
Compatibility: Mac II and MultiFinder friendly.
Application Size: 10 megabytes shipped on 13 800K disks.
Copy Protection: None

MacGraphics 3.0 is an overwhelming collection of bit-mapped clip art — 13 disks with a total of 10 megabytes of art! Each disk covers a different theme: Transportation, Birds & Animals, Trees & Plants, Business Graphics, Food & Beverages, People, Occupations, Caricatures, Special Occasions, Signs & Symbols, Sports & Recreation, Education, and Frames & Borders.

In general, the art is beautiful, but there are a few glitches. The Occupations images, in particular, suffer from traditional sex stereotyping. The male figures include a doctor, scientist, construction worker, executive, printer, baker, chauffeur, farmer, and cowboy. The featured females are a nurse, a waitress, and a couple of secretaries. At least not all of the characters are Caucasians, as was the case with version 2.0 of this collection.

You also probably won't be able to use all of the images. Why? The size. Almost everything is full-page. That's why the collection is so huge. What can you do with a full-page corkscrew? An 8-inch-wide tomato? An 11-inch-tall giraffe? A 7-x-7 Star of David?

Of course, you can shrink them, but that's where the problems arise. Those images that look good large aren't so hot when they are shrunk down. There are very few pictures here that print cleanly if you shrink them beyond 25 percent of the original. On an ImageWriter, the results aren't even worth it. The results are improved if you reduce the image and dump it to a Linotronic, but I suspect that few desktop publishers have access to such high-end typesetting equipment. To their credit, the MacGraphics folks have provided some images that lack substantial detail in the first place. This makes the reductions look that much better, but then the original large version doesn't look good.

In short, while MacGraphics is a beautiful collection, you may have trouble fitting the pictures to your needs.

— Sharon Zardetto Aker



This stately oak tree is vivid when printed at 100 percent, but it loses a lot of detail when reduced to a workable size.

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FREEHAND

A Helping Hand

Aldus FreeHand comes with a special file, UserPrep, that contains predefined PostScript routines, procedures, and variables. UserPrep can enhance FreeHand's drawing tools by providing special access to the power of PostScript; unfortunately, it receives scant attention in the FreeHand manual. There are only six references to UserPrep in the entire manual, and these leave much to the imagination. Since UserPrep shows probably the most intelligent and sensible approach to interacting with PostScript among the major graphics packages, a closer look at its inner workings may be rewarding for both the PostScript-literate and not-quite-so-literate.

First, be sure you've set up FreeHand as instructed in the manual, with the UserPrep file residing unobtrusively in your System folder. There are a couple of ways to open UserPrep, which is a text-only ASCII file. One way is to open it directly, using a word processor like Microsoft Word. The other way is to create a new file in FreeHand, then do a Save and simultaneously hit Command-K as described in "Preppy PostScript" (*MacUser,* December '88, p. 241). This creates an ASCII version of your file that contains the PostScript (PS) codes normally sent to the printer.

Open this ASCII file, and you'll see the line `%% "Laser Prep -- The Apple PostScript Dictionary (md)"` at the top. The following 15 to 20 pages are Apple's LaserPrep file, which FreeHand uses. Search for the string `%%EndProlog`, and you'll find yourself at the beginning of UserPrep, which FreeHand appends to Apple's prep file. Every time you send a FreeHand file to a PS printer, these two prep files are downloaded first. LaserPrep is complex and obscure. UserPrep, however, is marked by a refreshing clarity.

The UserPrep file begins with a preamble of sorts, describing nine predefined PS procedures that can be called up by using the PostScript option in FreeHand's Line and Fill menus. The manual briefly covers and illustrates these on pages 9-64 to 9-66, but you really need to read at least the first two pages of UserPrep to fully understand their use. Nine customized line styles are provided, including lines made up of repeating patterns of wedges, stars, bows, or hearts. The six fills include random leaves, hatch marks, a very attractive marble or granite-like fill, and something that the manual calls random grass — it actually looks more like a microscopic view of a five-o'clock shadow. Following these descriptions come the PS definitions themselves — about five pages of them.

Prep School

What if your idea of the ideal line or fill doesn't quite mesh with FreeHand's? Perhaps you'd like a nice herringbone pattern, or a fence-like effect. Not to worry — you can write your own style definition, or modify a PostScript procedure in UserPrep. Here's how.

Make sure you're still in UserPrep and search for `/wedge`. It will read like this:

```
/wedge { % len width angle startx
  starty grayval
gsave setgray newpath
  translate rotate scale
1 0.5 moveto 0 0 lineto 1 -0.5
  lineto closepath fill
grestore } def
```

Copy this entire definition. Paste it twice right after the original `/wedge` procedure, renaming the first copy `/lherring` and the second `/rherring` (Figure 1). In the second line of each, add

```
.05 setlinewidth
```

right after the word `setgray`. In the procedure `/lherring`, replace the words `closepath fill` with `stroke`. In `/rherring`, change the third line to read:

```
0 0.5 moveto 1 0 lineto 0 -0.5
  lineto stroke
```

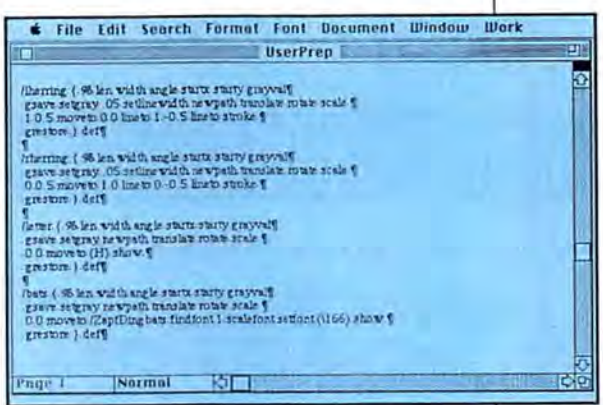


Figure 1: You can create customized line styles and fills by modifying the predefined PostScript routines contained in FreeHand's UserPrep file. Here, we've created procedures that will produce repeating patterns of left- or right-pointing herringbones, letters, or dingbats.

Save the UserPrep file so that your new procedures become part of it (make sure you save it as text-only). That's all it takes to create your first custom-made line styles. Both are herringbones, one pointing to the left, one to the right. The top graphic in Figure 2 shows them in a simple FreeHand drawing.

To use these new styles, open a FreeHand document and draw a line (or any shape for that matter). Select the line, pull down the Line menu, and choose PostScript. A dialog box appears, with the cursor blinking in an empty box. Type in `{lherring} 10 10 0 rope`.

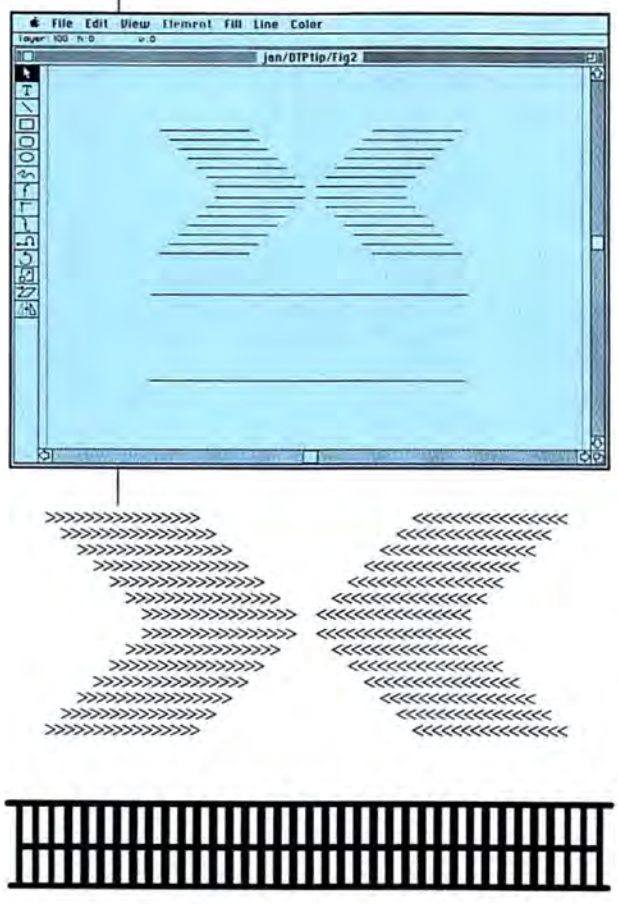


Figure 2: Customized styles created in UserPrep don't show up on the FreeHand screen (top). UserPrep will convert these lines to the new styles when they are printed. The two herringbones are at top; a series of overlapping H's form the "fence" in the center; and a line of Zapf Dingbats march across the bottom.

This tells FreeHand to look up the procedure `/lherring` in UserPrep, sets the width of the pattern (the first 10, in points), the height (the second 10), the gray scale (0 = black, 1 = white), and then calls up the predefined procedure `rope`, which turns the thin black line on the screen into a string of herringbone marks when it prints out (no WYSIWYG here). Click OK and the line style is set.

ABCs

If this sounds too difficult, take heart — you don't have to rely upon your skills as a PostScript programmer. A vast store of PS images are out there, close at hand, that people seldom think of using: the Adobe fonts stored in your LaserWriter.

Open up UserPrep again, search for `/rherring`, copy the entire definition and paste it right after the original procedure (Figure 1). Rename it `/letter`, delete the words `.05 setlinewidth`, and change the third line to read:

```
0 0 moveto (H) show
```

Save UserPrep again and return to FreeHand. Draw another line, make sure it's selected, go to the PostScript window as before and type in `{letter} 10 10 0 rope`. Print the page and you should see something resembling the fence-like structure in Figure 2.

What's particularly interesting about `/letter` is that it makes no formal font declaration. The result is that the specified letter (here an *H*) is printed out in Courier, but the letters overlap one another in the complete pattern. Try substituting other letters for the *H* in the third line of `/letter` (you'll have to reenter UserPrep). Some of the patterns may be worth adding to your graphics repertoire.

You could draw this pattern with FreeHand's drawing tools, but doing it with PostScript lets you avoid a considerable amount of repetitious duplicating, aligning, and so on. Built-in procedures like `/letter` can do it faster and more accurately.

Dingbats

Zapf Dingbats provides the richest store of graphic images for routines like `/letter`. Open up UserPrep one more time and go to `/letter`. Copy and paste it as before (Figure 1). Rename the copy `/bats` and make the third line read:

```
0 0 moveto /ZapfDingbats
 findfont 1 scalefont setfont
 (\166) show
```

Can you see the difference from `/letter`? This time we've made a font declaration. The font is scaled to 1, so that when you type the first two numbers in the PostScript window back in FreeHand, you will in effect be typing in the point size of the given character. Also notice the odd words `(\166)`. Since UserPrep is a text-only file, you can't directly type in a dingbat. You must refer to it by its octal code, which is PostScript's character-coding scheme. The diamond-shaped dingbat we're using (the one used in Apple's manuals) has an octal code of 166. The backslash tells the PS interpreter that what follows is a code.

Save UserPrep and return to FreeHand. Draw or select a line, and in the PostScript window enter `{bats} 10 10 0 rope`. The resulting graphic is a line of nicely spaced diamond dingbats.

By storing UserPrep routines like the three we've worked through, you can have a much wider choice of line or fill styles in FreeHand — a sort of PostScript answering service waiting for your call. And you don't have to be a PS genius to do it. By simply studying and modifying UserPrep's existing procedures, you'll find that you can increase the diversity of your work tenfold. Have fun! — *Gregory Wasson*

High Octane

Octal codes may be unfamiliar to you, but they're part of the bread and butter of the PostScript environment. If you want to refer directly to a specific character in a PostScript typeface while programming, as in our `/bats` example for FreeHand's UserPrep (see "A Helping Hand"), you may need to know its octal (base-eight) code.

Octal charts for the regular alphanumeric typefaces (those composed of letters and numbers), such as Times, Palatino, or Avant Garde, are widely available. For example, you can look them up in Adobe's reference manual, the so-called "Red Book." But you're out of luck for graphic typefaces like Zapf Dingbats. Where to find them? Well, the documentation that accompanies QMS PostScript printers includes complete charts for resident typefaces, including Dingbats. But if you're one of those rare people who don't want to shell out several thousand dollars just for an octal chart, take heart. Help comes from an unlikely quarter — a shareware DA called WriteFontSize.

Originally, WriteFontSize provided a way to use point sizes in MacWrite other than the limited set available from within the program. As a great fringe benefit for PostScripters, it also lets you determine the decimal, hexadecimal, *and* octal code of a character in any typeface on your System.

Figure A shows the DA's main window. You choose a typeface and size, and click the radio button for the code scheme you want represented. Type any character in the text window (such as the snowflake dingbat shown), and its code number appears in the ASCII Char box at the top of the window. Or you can type a code number in the box, and the character will appear. Choose Grid (Command-G), and all characters of the selected typeface are presented, laid out in a grid. You determine the correct code from the numbers listed on the x and y axes, as shown in Figure B. If you hold down Option and click while your cursor is on a character, it will be pasted into the DA's main window and its code number will show up in the ASCII Char box.

WriteFontSize is a nifty little DA for people it was never meant for — namely, PostScript programmers, who should find it a real time-saver. If you can't find it lurking on CompuServe or other online services, contact the author, Jeffrey S. Shulman, at P.O. Box 521, Ridgefield, CT 06877-0521. The shareware price is $7 ($10 for non-U.S. users). — *Gregory Wasson*



Figure A: Using the WriteFontSize DA, you can uncover the code number of any PostScript font character, such as this snowflake from Zapf Dingbats. Whether it's 144 octal, 64 hexidecimal, or 100 decimal, you've got its number. Who said no two snowflakes are the same?

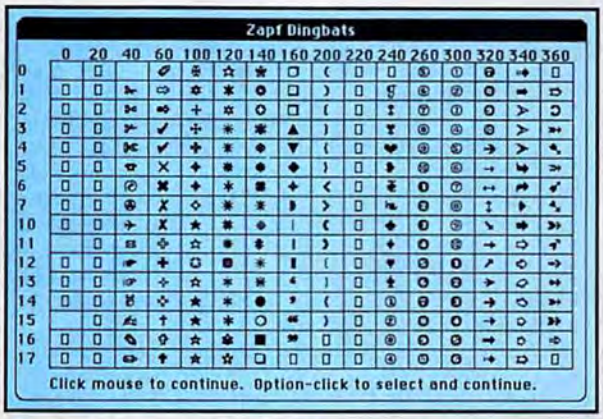


Figure B: And you thought "gridlock" was a nasty word! WriteFontSize can produce an easy-to-read octal chart of all the Dingbats.

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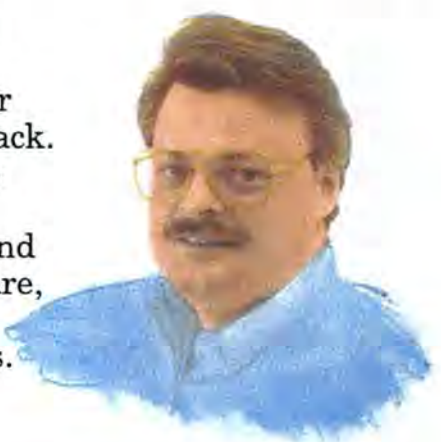
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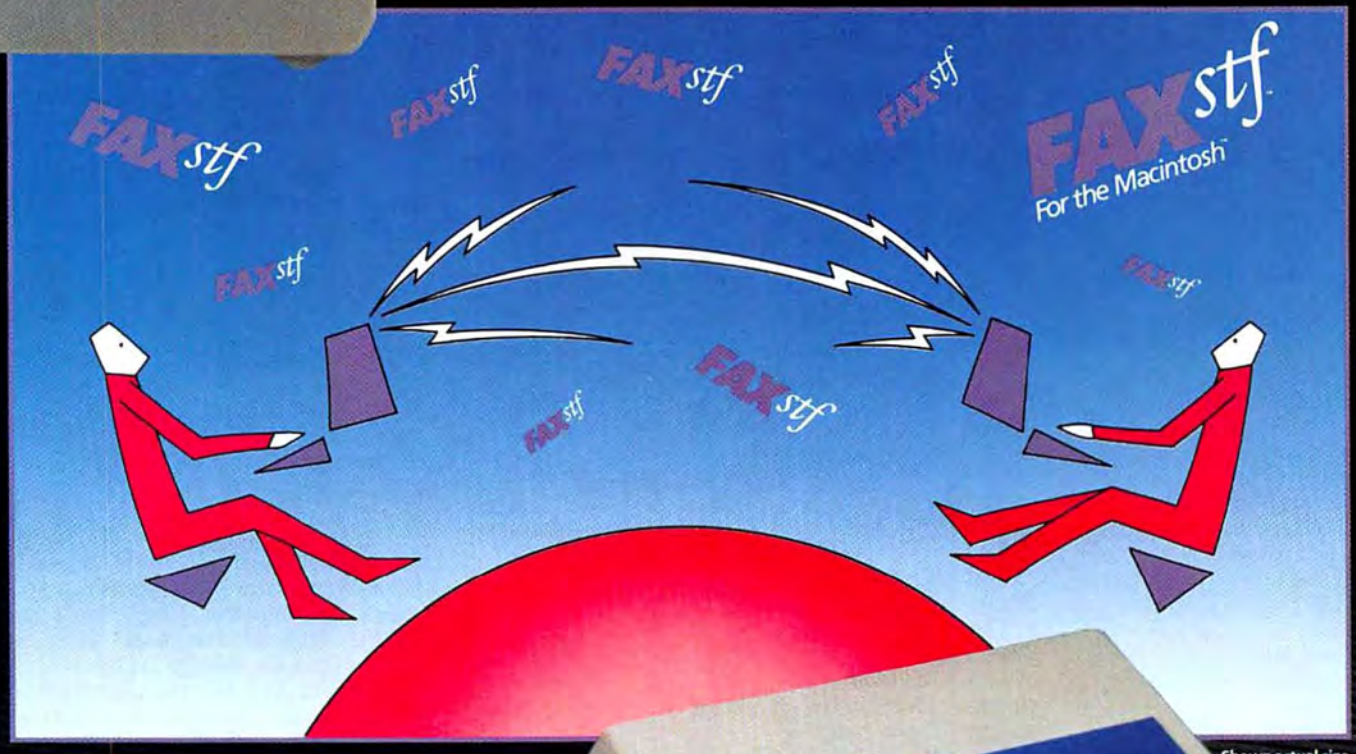
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TIP SHEET

COMPILED BY GREGORY WASSON

Found a trick, shortcut, or smarter way to get something done with a program? Share your hints by sending them to Tip Sheet, c/o *MacUser*, 950 Tower Lane, 18th floor, Foster City, CA 94404. We pay at least $25 for every hint we publish, plus we'll print your name and hometown.

Every month we'll select one tip as the Tip of the Month. The person who sends in that tip will receive $100 for it.

WORD

In Word, the Return key is used to end a paragraph, while Shift-Return is used to end a line without creating a new paragraph. Shift-Return works fine as long as it isn't used in a justified paragraph. In the latter case, the line created with Shift-Return is justified — something most people will want to avoid. And you can avoid it by pressing Shift-Option-Return.

This undocumented method of concluding a line is very useful for lines within a justified paragraph that, for example, are to contain only a mathematical equation located at a center tab. It's also the only way to create the appearance of multiple justified paragraphs within a single box. Simply apply the boxed format to the paragraph and conclude each pseudo paragraph within the box with a Shift-Option-Return. The concluding line of each "paragraph" will not be fully justified.

Incidentally, the Shift-Option-Return symbol that appears when Show ¶ is active looks just like the Return symbol.

ROBERT G. DINITTO
CHELMSFORD, MASS.

After reading the Tip of the Month in the September '88 issue, I gave it a try. Although the suggestion on how to access the ImageWriter's built-in fonts works, Word provides an easier way.

In the lower-left corner of the Word window is a rectangular box that usually contains a shadowed page number.

Click in this box and the word *Code* appears. This invites you to type a decimal (not hex) character code. Press Return to place that character in the text.

The decimal code for the escape character is 27 (this appears as a small box in your Word document). To access the variety of special fonts and font sizes built into the ImageWriter, simply add the escape codes at the beginning of your document and, if desired, at other points in your document. To do this, click in the Page box, type 27 in the place of Code, and press Return. Then in the main window, right after the small box that should now be showing, type the letter that will tell the ImageWriter what to do. Here's a partial list:

```
Esc n (Extended character set = 9 cpi)
Esc N (Pica = 10 cpi)
Esc E (Elite = 12 cpi)
Esc p (Pica proportional)
Esc P (Elite proportional)
Esc e (Semicondensed = 13.4 cpi)
Esc q (Condensed = 15 cpi)
Esc Q (Ultracondensed = 17 cpi)
Esc A (6 lines per inch)
Esc B (8 lines per inch)
```

When you're ready to print, make sure that you have ImageWriter selected in the Chooser.

DALE L. COCKRUM
WALLA WALLA, WASH.

Sometimes Word puts too much space between italicized words (especially if each word is capitalized, as in subheads or titles). Simply condensing italicized type usually results in squished type. But if you turn on Show ¶ from the Edit menu, you can select the space markers between the words and condense only them by using the Condense feature found in the Character dialog box. You can condense by anything from 0 to 1.75 points. After you've highlighted the first space mark and condensed it, go on to the next space mark, highlight it, and press Command-A ("Again") so you don't have to reenter the values in the dialog box. See Figure 1 for examples.

A. M. CONCEPCION
CHICAGO, ILL.

GENERAL

In "Portraits of the Artists," October '88, Natasha Lessnik described how she sometimes has to split up a file too large to fit on an 800K

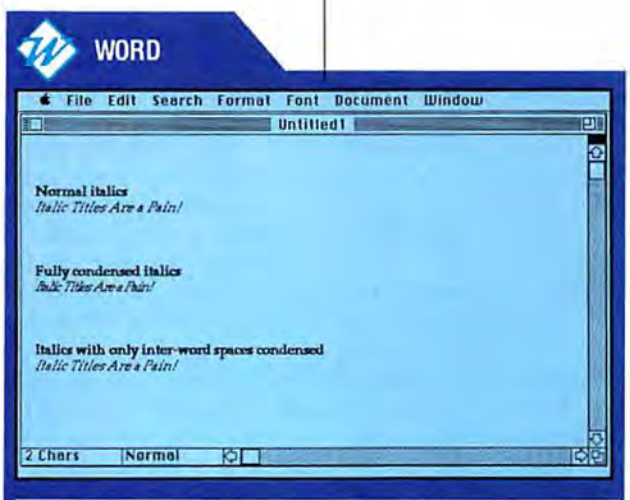


Figure 1: Italicized titles often look too widely spaced in Word 3.0. The program's Condense feature in the Character dialog box can help you out. Here are three examples.

floppy so that she can take it to a service bureau. Later she has to reassemble the artwork by manual pasteup. I have a related problem with scanned images. I frequently use a scanner at a local bureau and have often discovered after spending many hours and much money that the file won't fit on a floppy, so I can't take it home. The solution? If you have a program for backing up your hard disk, bring a copy of it with you the next time you visit the bureau. If a file becomes too large to save to a floppy-disk, use the backup program to back up the file (the program will break the file up — you can restore the fragmented file on your hard disk when you get home). Natasha can do the same, except that she will have to restore the file *at* the bureau before printing it out.

DIANA SHANNON
PRINCETON, N.J.

PAGEMAKER 3.0

One of PageMaker 3.0's most annoying flaws is its occasional failure to update the screen (as when the print dialog box disappears). Most users just scroll off the page or area of the page displayed and then back to recover the portion blanked out. If you have Pyro!, there is a much faster way to force PageMaker to refresh the screen: Just move the cursor to the sleep corner. When Pyro!'s startup screen shows, move the cursor back to the document. Your fully updated page jumps up to greet you. This is a lot easier than dealing with scroll bars or the grabber. [*PageMaker Version 3.01 fixes this frustrating "feature." Be on the lookout for it. — Ed.*]

RAHUL SABNIS
SILVER SPRING, MD.

Users of Apple's Extended Keyboard can choose tools from the PageMaker Toolbox window by using the following undocumented key combinations:

```
Control-Shift-F1 = Pointer
Control-Shift-F2 = Line tool
Control-Shift-F3 = Horizontal/vertical tool
Control-Shift-F4 = Text tool
Control-Shift-F5 = Square rectangle tool
Control-Shift-F6 = Rounded rectangle tool
Control-Shift-F7 = Ellipse tool
Control-Shift-F8 = Cropping tool
```

JOHN ALTMAN
ALHAMBRA, CALIF.

Most service bureaus charge less for printing one 11-x-17-inch sheet of paper or film than they do for two 8.5-x-11-inch printouts. To take advantage of that price break, use PageMaker's wide tabloid page setup and lay out two pages on one page. This also lets you produce bleeds (graphics that extend across two pages). Here's an example of how to set up two three-column pages on one tabloid-sized page. Set the left and right margins to be the *outside* margin measurements (since neither one is an inside, or bound, margin they should be equal). Next, choose the distance between columns and the number of columns, but choose seven rather than six columns. The columns will be evenly spread across the two-page spread. To rearrange them, you need to know the width of the column you want. For a three-column page, the formula is (8.5 – (2 × the distance between columns) – (outside margin + inside margin)) ÷ 3. Starting from the left margin, measure the width of your column and then drag the left side of the first column guide to that point. Zero the ruler to the right edge of the column guide and repeat the procedure for the second and third columns. Then move to the right margin and repeat the measurements for columns six, five, and four. The remaining "seventh" column (the one in the middle) and adjacent column divisions will be equal to the two "inside" margins. See Figure 2 for an example of this kind of setup.

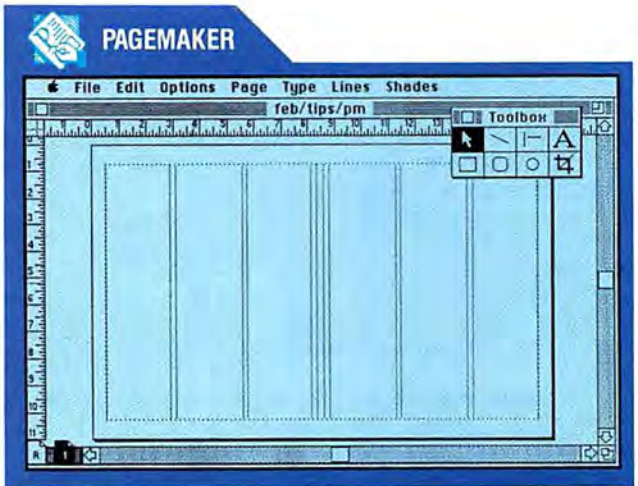


Figure 2: Setting up two pages on one output page can save you money when it comes time to make that painful pilgrimage to the local service bureau. Here it's done in PageMaker 3.0, but the same technique should be easily transferable to any page-layout program.

When printing proofs on a LaserWriter, be sure that you change the options at the bottom of the print dialog box so that the paper is set at Tall. At that setting, with the tile feature set at automatic and the overlap set at 0, the LaserWriter will print your proofs as neatly as if your layout were in an 8.5-x-11 format. [*You can also use a variation of this technique to print two pages on a single 8.5-x-11-inch sheet, provided that your page size is small enough, say 5 x 7. Just create two columns on a letter-sized page turned on its side — enter 11 x 8.5 in the Page setup box. The only disadvantage is that you cannot use PageMaker's automatic page-numbering feature, since autonumbering considers this setup as one page — place two tokens, one in each column/page, and both will read the same number. — Ed.*]

CLARICE KEEGAN
SEATTLE, WASH.

HYPERCARD



An easy way for Mac SE and II owners to switch between user levels is to create Control-key combinations by inserting the following lines into the Home stack:

```
on controlKey x
  if x=49 then
    set the user
        Level to 1
  else if x=50 then
    set the user
        Level to 2
  else if x=51 then
    set the user
        Level to 3
  else if x=52 then
    set the user
        Level to 4
  else if x=53 then
    set the user
        Level to 5
  else pass control
    Key
end controlKey
```

Now you can press Control and any number from 1 to 5 and be transferred to that user level.

GIZUR BERGSTEINSSON
REYKJAVIK, ICELAND



If you've ever wanted to make your HyperCard stacks like real Mac applications with an About... command in the Apple menu, copy the following resources (with ResEdit) to your stack from HyperCard itself:

```
 DLOG      ""About''
ID=2002
 DITL      ""About''
ID=2002
 STR#      ""About''
ID=2002
 ICON       ""Bill''
ID=2002
 ICON ""Hypercard''
ID=1001
```

Once you've loaded the resources in your stack by means of the scary magic of ResEdit, you can alter them to your heart's content without actually modifying the originals in HyperCard. To do so, make `STR#` read whatever you want; move, add, or delete any of the icons; or place your own text inside the `DITL`. You can even move the DLOG box elsewhere. Now, when you open your HyperCard stack, the About... command will really tell other users what your stack is all about. So if you're tired of the same old HyperCard programming team, add a little spice, delete Bill's lovely face — and put in whatever you want.

BENJAMIN KUO
SALT LAKE CITY, UTAH

IMAGEWRITER LQ



When I saw the tip in the October 1988 issue for the ImageWriter LQ suggesting that LQ owners tear their ribbons apart to "double their life," I had to respond and save a few LQ owners undue frustration.

If, as the tip's author mentioned, the top edge of your ribbon is receiving the brunt of the printing load, it's only because you don't have the ribbon seated properly! I discovered this after many months of LQ operation and not a few $19 ribbons worn out at the top edge. A kind tip from a person on CompuServe set me straight. A well-worn LQ ribbon has four parallel wear lines spaced evenly up and down on its surface reflecting the up and down movement of the print head. An improperly seated ribbon defeats this motion, and the result is the characteristic top-edge fraying. In other words, you're using only one-fourth of your ribbon.

Nowhere does Apple tell you this, and repair technicians seem unaware of the problem or its solution. If you set up the printer as the manual instructs, there's every chance that you won't seat the ribbon properly, because doing so requires a degree of force and thumb pressure that most people will not instinctively apply to a new $1,300 printer.

To seat your ribbon properly, you must apply *very strong* thumb or finger pressure to the extreme end of each of the little arms that extend out from each end of the cartridge. You will feel a very satisfying click when it is properly installed.

KEN REESE
LEBANON SPRINGS, N.Y.

TIP OF THE MONTH

FREEHAND



Aldus FreeHand can open Adobe Illustrator 1.1 files for editing, but it can't open Adobe Illustrator 88 files — unless you do the following.

First, open the Illustrator 88 file with Illustrator 88 and Save As an Illustrator 1.1–compatible file to convert custom colors to process colors and defeat masking, as well as remove all patterns and placed or imported images. All objects will be retained. Next, if you have Illustrator 1.1, simply open the file with 1.1 and save it. It can now be opened by FreeHand.

If you don't have Illustrator 1.1, open the file with a text editor capable of saving text-only files. Change the second line from

```
%%Creator:    Adobe
Illustrator 88 (TM)
1.6
```

to

```
%%Creator:Adobe Il-
lustrator(TM) 1.1
```

(Note carefully the deletion of the space before `Adobe`.) Save as text only. Open the file with a resource editor and change the Creator from ARTZ to ARTY. The resulting file can be opened and edited in FreeHand.

BILL WARE
CLEBURNE, TEX.

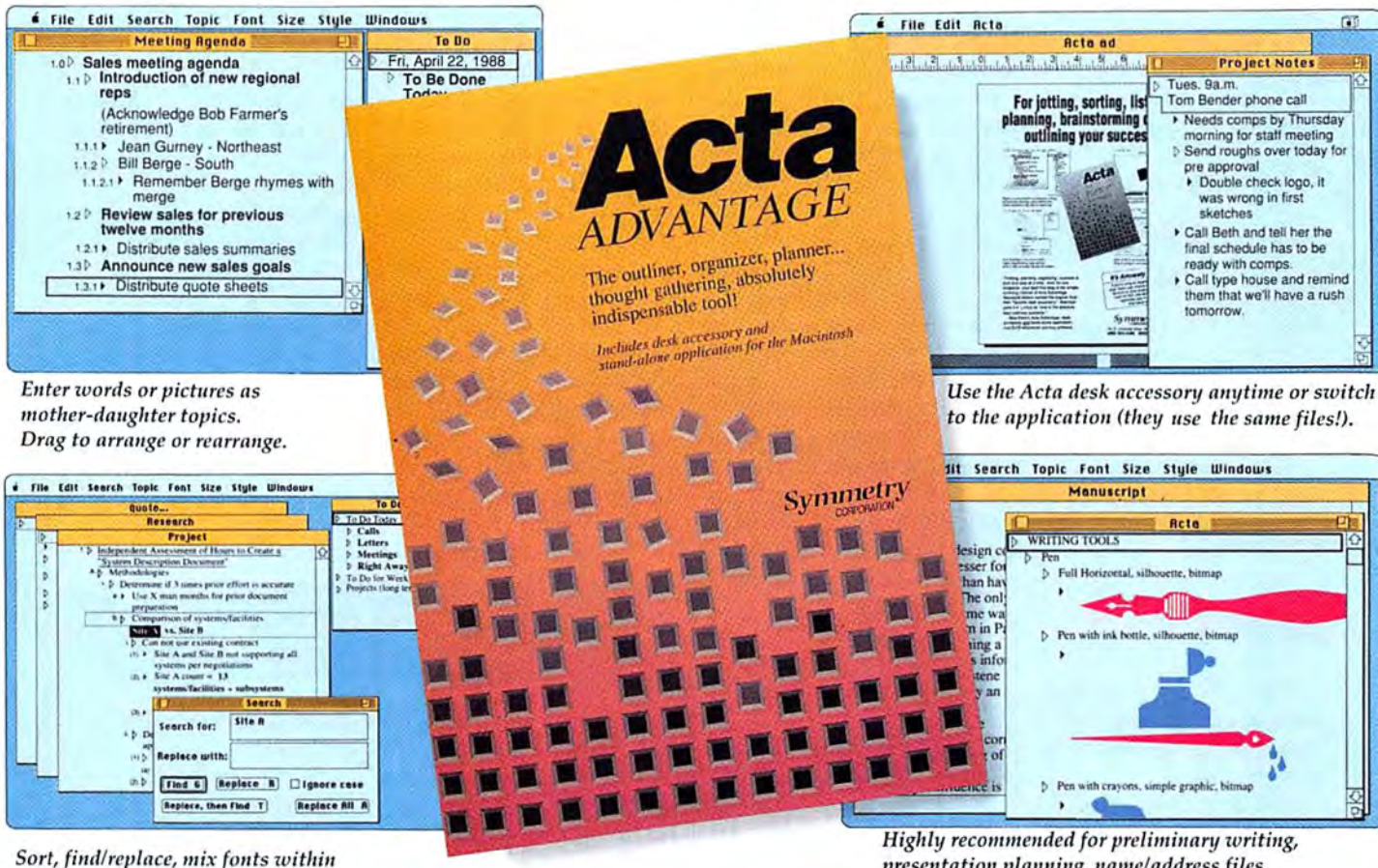
ADOBE ILLUSTRATOR 88



You can cancel Preview Illustration by typing Command-period. This is useful if you are using patterns or color and the part you wanted to check has already previewed, since it can take several minutes for the entire illustration to preview in full.

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HYPER SPACE

For this month's news we went on the trail to bring you the happenings at the Boston HyperExpo. You'll find a HyperCard look-alike, a user-friendly book, and a stack for lawyers. We also review HyperAnimator. Check Michael Swaine's Card Tricks for more tricks of the trade.



Graphics and pointers make the text in HyperCard QuickStart easier to navigate and understand.

X: You Are Here

You've seen those maps scattered around shopping malls with all the stores listed and an *x* to indicate "You are here." Well, the book *HyperCard QuickStart* by Richard Maran is like one of those maps, only each topic has its own map (the book is made up of two-page spreads, or topics). Down the right-hand page you find the titles of all the sections of the book. Across the top are the topics for each section, and pointers show your current location by topic and section.

HyperCard QuickStart is a book for beginners who have some knowledge of the Mac but no knowledge of HyperCard. It covers four of the five user levels, leaving Scripting for the more advanced books. It takes you from the installation of HyperCard on your hard disk through using cards, fields, and buttons, to printing and authoring your own stacks.

The book is structured somewhat like HyperCard with themes, associations, and links. Just think of each spread as a card; the cards make up sections (stacks), and the pointers act as buttons to help you move to the desired topic. Key information is grouped together. Where more information or explanation may be needed, topics and page numbers are supplied, thus eliminating repeated trips to the index.

If a picture is worth a thousand words, then the more than 100 illustrations are worth millions. Most of the concepts are presented in both words and pictures, with important areas emphasized by red lines.

Yes, *HyperCard QuickStart* joins the myriad of books on HyperCard, but it is one you may find easier to use. Even experienced HyperCard

PETER A. GOULD

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All HyperKit products have an unconditional 30 day money back guarantee. Minimum system configuration: Macintosh with one megabyte of RAM, two 800K disk drives and a copy of HyperCard. HyperKit is a registered trademark of SofTec. HyperCard and Macintosh are trademarks of Apple Computer, Inc.

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users may find it a valuable, user-friendly reference.

HyperCard QuickStart is published by Que Corporation, 11711 N. College Ave., Carmel, IN 46032; (800) 227-7999; in Indiana, (317) 573-2540.

— *Laura Johnson*

The Apple II Association

What is to the Apple II as HyperCard is to the Macintosh? Don't despair if nothing comes to mind. Everyone knows that HyperCard is Macintosh software — it doesn't run on an Apple. A few of you, however (especially if you visited the AppleFest held in San Francisco in September), may be able to make the association. Techware Corporation of Altamonte Springs, Fla., introduced Tutor-Tech at that show, billing it as HyperCard for the Apple II.

Tutor-Tech is a hypermedia tool kit for the Apple II series. It allows you to *browse, author,* and *link* — terms familiar to HyperCard users. Its basic unit is the page. Pages, facts, ideas, and images can be connected by buttons. And Tutor-Tech gives you access to videodisc players and speech synthesizers.

Tutor-Tech gives users the power to design software — a boon for teachers and trainers who want to create their own courseware. The basic unit, Tutor-Tech Teacher & Student, sells for $195, and the Tutor-Tech Grader option (for educators who use Tutor-Tech for computerized exams), for $95. For more information, contact Techware Corporation at P.O. Box 151085, Altamonte Springs, FL 32715-1085; (407) 695-9000.

And, Apple II users, welcome to "almost" HyperCard!

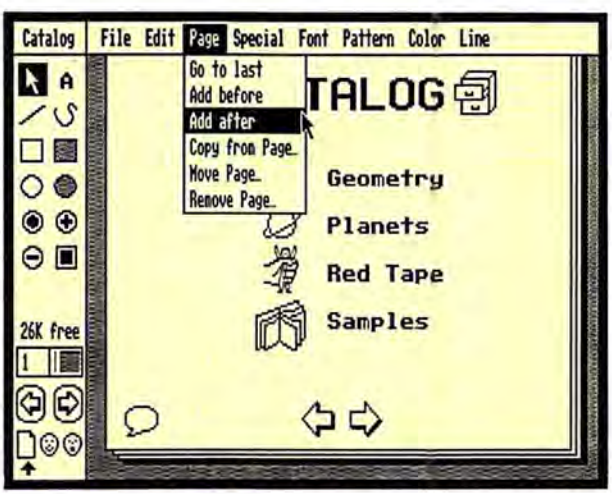
— *Laura Johnson*

Legal Aide

Would you pay between $1,950 and $4,450 for a HyperCard stack? If you're an attorney and/or you run a law office, that money, if spent on GLOSS, might be the best investment you make this year.

What's GLOSS? GLOSS is the Ghent Farm Legal Office Support System, a powerful vertical-market product for law offices. This versatile system can handle virtually all the needs of a firm of attorneys. GLOSS comes in single-user, site-licensed, nonnetworked multiuser, and fully networked multiuser versions. All versions can be purchased complete with installation, support, and either one or two days (depending on the number of users) of on-site training. All versions of the package feature one-time entry of client data, very powerful billing and reporting options with Unbill and Rebill features for making corrections to bills, and much more.

Since GLOSS was designed to be friendly to non–computer users, as



Shades of HyperCard? Tutor-Tech's menus and buttons are very similar to HyperCard's, but it runs on Apple IIs.

THE SECRETS OF WRITING BUSINESS LETTERS

As far back as biblical times, businessmen have used powerful communication to achieve wealth and position. "How forcible are right words!" cried Job.

Even today the right message at the right time can lead to sweet success.

Want money? A promotion? To sell something? Explain something? Then write a good letter.

Letter writing is not a lost art, just a forgotten one. The principles still exist. If you try them, you'll see improvement in your very next letter.

TO BEGIN WITH

1. Start from the end. Decide what you'd like to happen as the result of your letter.

Make a list of all the things you'd like to say. Look them over. Find any that don't support your main cause, and cross them off without remorse.

Remember, the best letters have a strong sense of purpose.

2. Get to the point early. If your reader wanted a mystery, he'd be reading Raymond Chandler. A letter should tell whodunit in the first paragraph.

3. Put yourself in your reader's place. Think: if the same letter came to you, how would you respond?

Therefore, be friendly. Be nice. And find ways to turn negative statements into positive ones.

NO BUSINESS-ESE

4. Say it plainly. There is no such thing as a "business language." Phrases like "in compliance with your request" and "enclosed herewith" will only make you seem like a robot. Write the way you talk, naturally.

Keep your sentences short — one idea in each. Any sentence longer than two typed lines is automatically suspect.

5. Clear the deadwood. Chop out words, sentences, and even whole paragraphs if they don't contribute. Work hard so your reader won't have to.

In particular, cast a questioning eye on adjectives. They can sap the strength from your words, or stretch your credibility. As Voltaire put it, "The adjective is the enemy of the noun."

6. Use active verbs. Face it, the passive voice is wimpy. "A decision has been reached by the committee" wouldn't last three rounds in the ring with "The committee has reached a decision."

Also, your reader will sniff a coverup if you write: "Your order has been misplaced" instead of "I misplaced your order." Courage!

7. Be human. Your letter should read like a conversation, not a decree.

Address your reader by name: "Dear Ms. Hartman." And if you can fit it in naturally, use Ms. Hartman's name once or twice in the body. You want her to know you wrote the letter just for her.

Whenever you can, use pronouns like *I*, *we*, and *you*. Especially *you* — it's an arrow straight to your reader's heart.

BE POSITIVE

8. Never write in anger. Your anger will evaporate; your letter won't. Harry Truman often vented his fury in letters. He also had the sense never to send them.

Devise a way to handle the problem in an upbeat manner. Your chances of success will multiply tenfold.

9. End it with an action step. The last sentence of your letter should suggest the reader's next move. Or your own next move.

Resist the hat-in-hand, shuffling type of exit: "Again, thank you for..." or "If you have any problems, please don't hesitate to call."

Instead, try closing with a plain and simple "Sincerely," and your signature. It may be the perfect ending.

10. Be professional. The strongest business letter in the world can't survive a bad presentation.

Set up a clean, logical format for your letter. A crowded or overdesigned page will distract from your message.

11. Develop a regimen. The keys to powerful correspondence are 1) writing often and 2) responding quickly.

If it sounds like work, read on.

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And the list of features goes on.

QuickLetter is a desk accessory, so it'll always be there when you need it, no matter what other program you're working in. It even lets you keep several windows open at the same time.

There you have it. All the secrets of brilliant business correspondence at your fingertips. Except one. And you can pick that up at your local software store.

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most attorneys are, it's a totally interactive system. And it uses HyperCard. The basic modules include Client Data, Client Billing Information, Client Matter Information, Financial Details, Matter Billing, Billing Parameters, Billing Rates, and Flexible Reporting.

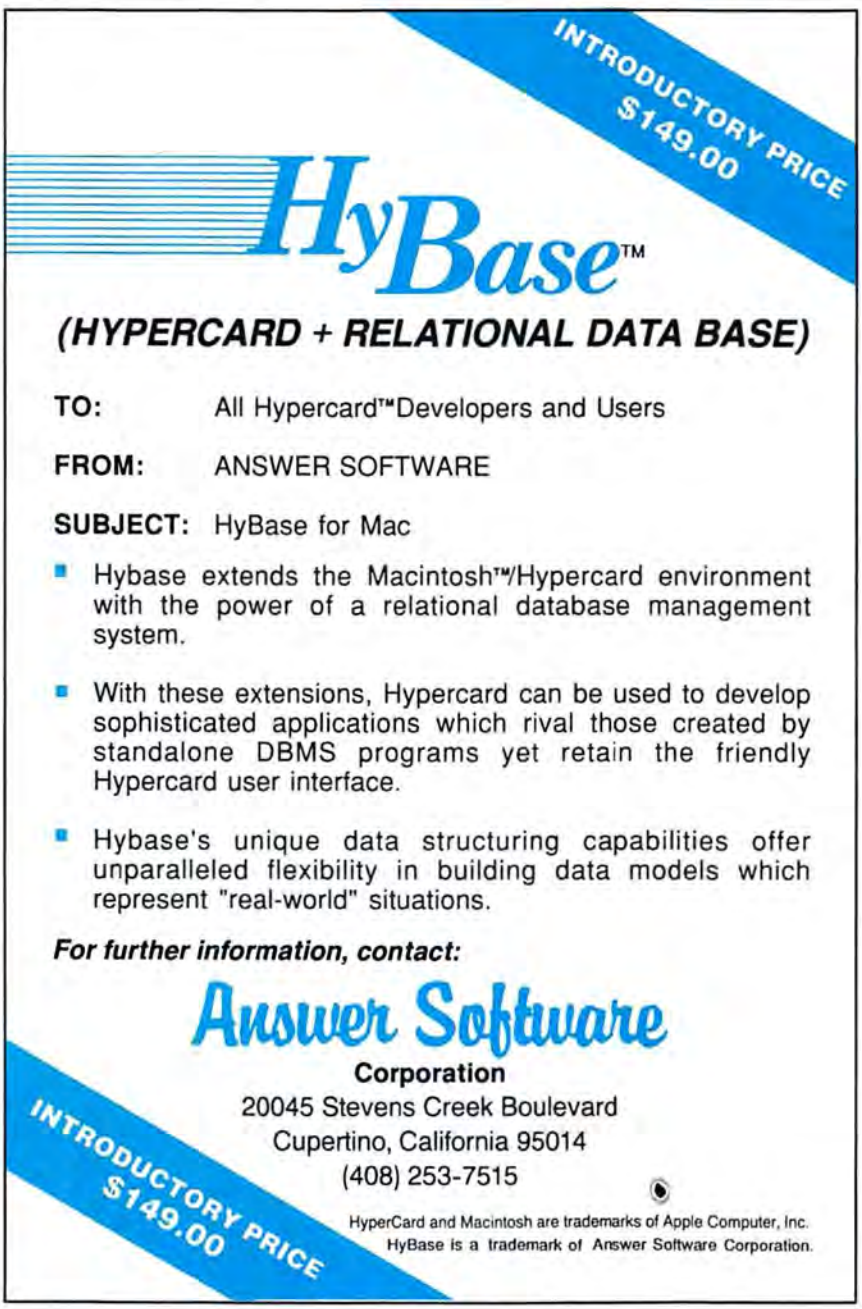
Access to the various modules can be restricted to certain users or left open to all.

Unlike many of the stacks you've seen to date, the cards have a lot of power buried within them. Most cards actually call upon fairly substantial traditional programs, but users don't have to deal with anything other than the clean accessible HyperCard interface.

This program has the power and flexibility of a mainframe legal program with the advantages of a well-thought-out HyperCard-based interface.

If that seems just what your law firm or your lawyers need, contact Ghent Farm — whose motto is "where ideas grow" — at RD #1, Box 181, Lower Post Road, Ghent, NY 12075; (800) 527-9199. New York City residents should call (212) 255-6754; other New York residents should call (518) 828-9637.

— *Steven Bobker*



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On the Freedom Trail

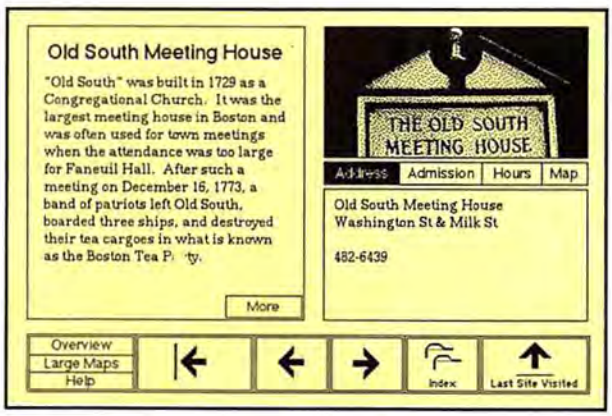
The second HyperExpo, held in Boston in October, brought no spectacular new software, no exciting HyperCard birthday parties. Rather, it seemed a quiet celebration of the business of hypertext.

Yes, hypertext (nonlinear writing) — HyperCard has gotten all the hoopla, but there were hypertext systems out there long before Atkinson's baby appeared (NoteCards, Guide, and Hyperties, for example).

Some of them even run on IBMs and other systems.

The real excitement came in the panel discussions, as educators, other professionals, businesspeople, and musicians shared their applications and their hopes and dreams for the future of hypermedia (hypertext that incorporates text, graphics, video, and sound).

There were visions of vast amounts of knowledge made easily accessible through hypertext media; of learning systems where the student has much more control over what and how to learn and in what sequence to learn it (interactive hypermedia); and visions of the integration of computers, video, and television. Imagine people in different locations sharing files and working on the same documents at the same time, electronic marker boards and electronic hallways to



Let your Mac do the walking along the Boston Freedom Trail disk.

walk you through an architect's concept of an unconstructed building.

Some of these things are happening now, with education in the forefront. The Perseus Project, Harvard's interactive curriculum on classical Greek civilization, is an ongoing project; there's a history of astronomy with animated models of orbits from Dartmouth, a biology program on molecular genetics, and a Chinese language program that draws characters. We also saw a stack from the Berklee College of Music that lets you use a Tripp-Strip controller for a Yamaha synthesizer.

On the corporate side, there's Xiphias' National Telephone Directory ($150), which should be out by the time you read this. Other hypertext applications include Cameo II, an emergency responder to chemical spills, and Broderbund's DTP Advisor ($79.95), a training tool and project management system.

While dreams and large systems dominated the panels, small companies and special interests were well represented on the show floor. There were RDAide by Pages ($84.95), a nutrient analysis database; Tax Stacks ($69.95), a HyperCard income tax preparation program from StackWorks; and a foreign-language series for Russian, Greek, Spanish, and French, ($19.95 to $39.95), from HyperGlot. Contacts ($99.95) by Applied Imagination is a networking tool for managing contact information that has mail-merge capabilities. Of use to most everyone is Softworks' Stack Cleaner ($49.95), a utility kit that substitutes HyperCard's standard abbreviations into scripts, lets you merge and duplicate stacks, and create and modify menus. HyperCom ($99.95), introduced by GAVA, allows communication through HyperCard over AppleTalk. For Mac II owners there was ColorCard (to be released in December) from Drexel University, a multiwindow environment for HyperCard that supports gray-scale and color images. And, appropriately, from the Boston Computer Society comes The Boston Freedom Trail ($4 to members, $10 nonmembers), a guide to this historical area.

The honeymoon may be over — HyperCard hasn't become the ultimate all-purpose application for everyone — but it has found its niche and has focused attention on other hypermedia. And together, HyperCard, hypertext, and hypermedia are bringing a freedom to computer users that they have never before known.

— *Laura Johnson*

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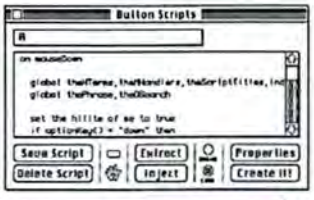


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HyperAnimator

HyperAnimator is not an animation program, though it does use simple animation to achieve its effects. Nor is this the infamous Knowledge Navigator, though it might be a distant relation. HyperAnimator provides an easy way to plunk a talking head into a HyperCard stack, where it can say whatever you want it to.

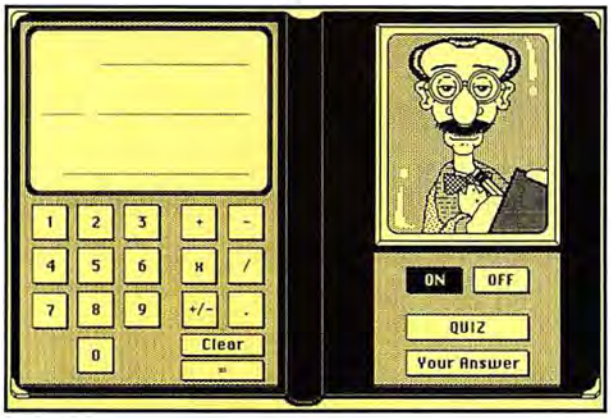
HyperAnimator enables you to create actors, which are crudely animated digitized or cartoon heads, to mouth the text you want them to speak. Each actor has a set of 16 expressions. Half of these are used to mouth phonemes. In other words, when the script calls for a "w" sound, the actor makes like a fish. The rest of the expressions are used for attitudes like "smirk," "smile," and "sleep" and for facial motions like blinking or looking to one side. All these expressions can be programmed with simple commands, and the phonemes are automatically generated when speech synthesis is used.

Though the animation is crude, that doesn't mean it's not effective. If an actor is based on a digitized photograph, the effect is even reasonably realistic.

Only one of the eight actors provided with the program looks like a real person, though. The others are cartoon characters ranging from a nutty professor to a Cecil-and-Beanie-type sock.

How much use you can get out of HyperAnimator depends on several things. For instance, because this program really is a supplement to HyperCard, you won't get far if you're not comfortable with that program. If you want to create your own talking head (which itself involves a fair amount of work), you'll probably want to author a HyperCard stack to put it in (or you can put it in an existing stack). That doesn't mean that you need to be an expert HyperTalk programmer — just that you have to be able to create and modify stacks. HyperAnimator's language is simple and should pose no problem.

If you want the best sound quality



Canny Professor Calculator is an example of how you might use HyperAnimator to personalize your stack with an innovative interface. Or make it insufferably cute, depending on your point of view.

possible, you must supply HyperAnimator with sound resources instead of synthesizing speech from the MacinTalk driver. This is a limitation, since sound resources don't lend themselves to long-winded addresses. A series of short phrases shouldn't be too difficult, though. You can use MacRecorder, from Farallon Computing, to record them. The HyperAnimator documentation comes with good instructions on how to lip-sync your actor to the recorded sound resource (this keeps your actor from looking like he's fresh from a Godzilla movie).

If you choose to use MacinTalk there's no limit to how long the voice can drone on. It will, however, sound like a computer. This might be convenient if your animated talking head is a robot, but otherwise you'll probably want to spend some time fine-tuning the sound with phonetic spellings and explicit intonations until it sounds more like human speech. The documentation gives enough information about how to do this, but it seems to be one of those skills that's best gained through practice.

HyperAnimator looks and feels like a HyperCard stack, but its level of polish is comparable to such popular applications as Business Class and Focal Point. How people will use this new capability in HyperCard stacks is anybody's guess.

Bright Star provides examples that range from a talking calculator (Professor Calculator) to a Hypersecretary. The company also markets a separate application called Talking Tiles, which demonstrates how the idea can be applied to education — in this case teaching reading phonetically.

Is this a gimmick or is it the future of computer interfaces? Imagine a refinement of the technology — better animation, better speech synthesis, more expressive actors — it's clear that people will soon be creating whole new actors who will be indistinguishable from your average Burt Reynolds Dinner Theatre graduate.

HyperAnimator is still a long way from that, but it does point the right way, and you can put it in your HyperCard stacks today. It'll be interesting to see where and how the results turn up.

Desktop acting, anyone?

— James Bradbury

HyperAnimator

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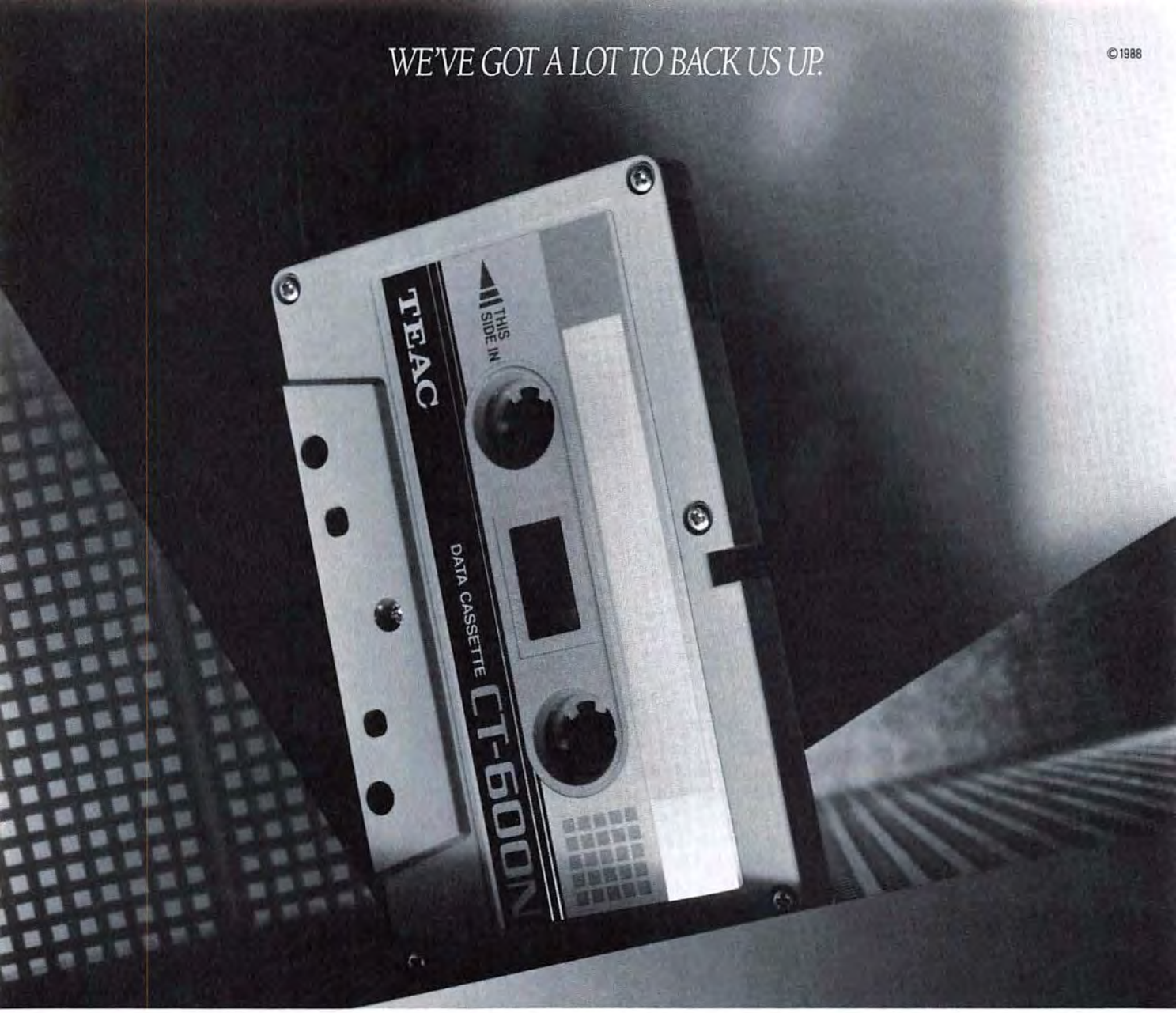
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Beyond the Fields We Know



"I hope that no suggestion of any strange land that may be conveyed by the title will scare readers away from this book; for, though some chapters do tell of Elfland, in the greater part of them there is no more to be shown than the face of the fields we know, and ordinary English woods and a common village and valley, a good twenty or twenty-five miles from the border of Elfland."

—Preface to *The King of Elfland's Daughter* by Lord Dunsany

When you've sojourned for a time in the land of HyperCard, you eventually fetch up with a jolt against one of its borders. Names of things can't exceed 31 characters. The entire card is loaded into memory, so the size of your cards is limited by available memory, which is a function of various factors. And no matter how good a typist you are, you can't key more than 29,997 characters into a field. HyperCard fields are limited to 29,997 characters.

When you begin writing scripts in HyperCard's programming language, HyperTalk, you run up against more barriers. You can have only 512 variables active at one time. Scripts can be no larger than 30,000 characters. You can't read more than 16,384 bytes at a time from an external file. The first script I wrote for *MacUser* ran into a barrier: It generated a lot of information, storing it automatically into a field; but HyperCard fields are limited to 29,997 characters.

No matter how good a typist you are, you can't key more than 29,997 characters into a HyperCard field.



By Michael Swaine

There are ways to live within the borders. Thirty-one characters are enough for naming things if you name wisely. If you have too many variables, you can probably combine some of them: The limits on the size and complexity of individual variables are much less restrictive than the limit on the number of variables. You can read repeatedly from files. Dealing with oversize scripts can be a difficult problem, but often the solution is to move some of the script's handlers elsewhere in the hierarchy. I solved my field-size problem by simply using more than one field; this is the obvious solution to the problem of storing bodies of information that exceed 29,997 characters while still working within the boundaries of the fields we know.

You can see the problem with this field-size solution, though: It is not general. I'd have to create it anew for every stack that needed it, and my scripts would have to be written in the knowledge that there were several fields for them to deal with. What I yearned for was a general approach, a new kind of field that could be as big as I needed. HyperTalk lets me refer to "chunks" of fields — individual characters, words, items, or lines — so I should be able to refer to a chunk of my imaginary monster field, asking for the 100,000th character or the 100,000th line. Or the 100,000th character of the 100,000th line. Since actual fields don't work that way, let's use the term *virtual field* for this magical entity that would take us beyond the fields we know.

This month's script is a simple implementation of virtual fields. It consists of five main functions: vField, vChar, vWord, vItem, and vLine; plus several auxiliary functions. These functions let you treat any HyperCard field as a virtual field. They let you refer to the virtual chunks of fields — or, if you prefer, the chunks of virtual fields. You can retrieve a particular virtual chunk or put data into it, just as you can with ordinary fields, except that virtual fields can be as big as you like.

To make these functions available to your HyperTalk scripts, install them in the Home stack script or in the script of any stack or background to which you want them to apply. Using them in your scripts amounts, basically, to substituting the virtual-chunk function for the corresponding HyperTalk function (vLine for line, vWord for word, and so on) and applying the vField function to the name of the field. Unfortunately, it's a little more complicated than that, because the syntax for my functions is not as Englishlike as HyperTalk's. For such normal field references as these:

```
get char 100000 of field theField
put char 5 of line 100 of theField into
¬ theChar
put "hello" into word 3 of theField
put "goodbye" after line 300 of theField
```

you must substitute virtual-field references like these:

```
get vChar(100000,vField(theField))
put vChar(5,vLine(100,vField(theField)))
¬ into theChar
get vWord(3,vField(theField),"hello")
get ¬
vLine(300,vField(theField),"goodbye","after")
```

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The vField function takes one parameter: the name of the actual HyperCard field. Think of it as turning the actual field into a virtual field. The other main functions take from two to four parameters. Their first parameter is the number of the character, word, item, or line. Their second parameter is the virtual object in question: either a virtual field, such as `vField(theField)`, or a virtual chunk, `vLine(10,vField(theField))`.

The third and fourth examples above demonstrate the syntax for putting information into a virtual field. Supplying a third parameter to one of these virtual-chunk functions signals that you want to write whatever is contained in the third parameter to the field at the chunk specified. The fourth example adds as a fourth parameter a preposition (before, after, or into) to specify further where the text is to go, just as you can do in HyperTalk. Why I implemented the functions in this way is a boring story of programming prejudice and coding compromise, but the effect is that your scripts can more or less do with virtual fields whatever they can do with ordinary fields, but without the size limitation.

In short, any field that you access with these functions will become a virtual field, capable of holding as much information as the memory capacity of your machine will allow (beyond every border there lies another border). What's the magic? Extra "actual" fields, the same method that I described at the beginning of this column, but applied automatically for you.

The main thing you need to know about what these functions are doing behind your back is that they create extra (hidden) fields as needed, and that they name those extra fields by appending one or more underscore characters (_) to the original field name. A virtual field named BigField and containing 80,000 characters may be implemented as three actual fields named BigField, BigField_, and BigField__. Mess with those extra fields at your peril.

These virtual fields have their own boundaries and limitations. The most important is that they are not bulletproof commercial products. They probably have bugs, and you should not rely on them blindly for any important purpose. If you try them and like them, consider taking them apart and putting them back together again. Scripts are much safer if you know you can fix them yourself when they break. Second, although HyperTalk chunk expressions such as `word 1 of line 1` can be used with any container, these virtual chunks work properly only with fields (in fact, only with background fields), so you can't "virtualize" the message box or a variable, although I don't know why you'd want to. Third, the functions' propensity for creating new fields is incompatible with any script that assumes something about the number of background fields. And not every HyperTalk field reference can be transformed into a virtual-field reference directly; `add 1 to item 100000 of field 1`, for example, won't.

Finally, these functions are intended for the programmatic manipulation of fields; if you type directly into the fields, you may run into trouble, though with fields of this size I'd recommend doing data entry through a small data-entry field or dialog box anyway.

And in the final analysis, why should we expect virtual fields to behave exactly like ordinary fields?

"For the twelve that were of the parliament of Erl...gazing over their familiar lands, perceived that they were no longer the fields we know."

— Final sentence of *The King of Elfland's Daughter* by Lord Dunsany

```
-- Virtual Fields by Michael Swaine
-- Released to the public domain, November, 1988.

-- These handlers should be placed in a stack script.
-- They implement a simple (and limited) approach to
-- virtual fields; that is, fields that can grow
-- without limit. Their use is explained in MacUser,
-- February, 1989. Anyone using this script should
```

```
-- be aware of the following:
-- • This script is far from bulletproof.
--   If you intend to make serious use of vir-
--   tual fields, consider this script a re-
--   search tool.
-- • The maxField parameter, set in function
--   vField, is a hedge against my sloppy programming.
--   Actual fields can hold 29,997 characters; you
--   should limit the actual fields comprising your
--   virtual fields to far fewer characters, just to be
--   safe(r).
-- • Reads can be nested; writes can't. That is, you
--   can retrieve the second character of the third
--   line of a virtual field with:
--    vChar(2,vLine(3,(vField(obj))),
--   but writes can involve only one chunk type:
--    vChar(2,(vField(obj),"X","before").
-- • There are other ways of accessing actual fields
--   that are not supported in this implementation of
--   virtual fields. The most serious lack is a delete
--   function. Although you can write empty into any
--   chunk of one of these virtual fields, you can't
--   easily delete chunks.

-------------------------------------------------------

function vField fieldName
  -- "Virtualizes" the field whose name is given.
  -- Stores the field's name in a global variable
  -- and returns the contents of the field.
 global vFieldName,maxField
  -- MaxField = maximum actual field size you allow.
 put 25000 into maxField
 put fieldName into vFieldName
 do "put" && fieldName && "into theField"
 return theField
end vField

function vWord w,obj,text,preposition
  -- Accesses word w of virtual object obj.
  -- 2-parameter version reads, 4-parameter writes.
 if the paramCount=2
 then return vWordR(w,obj)
  else
   if the paramCount=3
  then return vWordW(w,obj,text,"into")
    else
     if the paramCount=4
    then return vWordW(w,obj,text,preposition)
    end if
  end if
end vWord

function vItem i,obj,text,preposition
  -- Accesses item i of virtual object obj.
  -- 2-parameter reads, 4-parameter writes.
```

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```
 if the paramCount=2
 then return vItemR(i,obj)
  else
   if the paramCount=3
  then return vItemW(i,obj,text,"into")
    else
     if the paramCount=4
    then return vItemW(i,obj,text,preposition)
    end if
  end if
end vItem

function vLine l,obj,text,preposition
  -- Accesses line l of virtual object obj.
  -- 2-parameter version reads, 4-parameter writes.
  if the paramCount=2
  then return vLineR(l,obj)
  else
   if the paramCount=3
  then return vLineW(l,obj,text,"into")
    else
     if the paramCount=4
    then return vLineW(l,obj,text,preposition)
    end if
  end if
end vLine

function vChar c,obj,text,preposition
  -- Accesses character c of virtual object obj.
  -- 2-parameter version reads, 4-parameter writes.
  if the paramCount=2
  then return vCharR(c,obj)
  else
   if the paramCount=3
  then return vCharW(c,obj,text,"into")
    else
     if the paramCount=4
    then return vCharW(c,obj,text,preposition)
    end if
  end if
end vChar

function vWordR w,obj
  -- Returns word w of virtual object obj.
  global vFieldName
  put (last char of obj is "_") into continuedFlag
  if continuedFlag then delete last char of obj
  put the number of words of obj into numChunks
  -- Is it on this page?
  if (w ≤ numChunks)
  then
   -- Then perform the read operation.
   return word w of obj
  else
   -- Is there a continued page?
   if continuedflag
```

```
    then
      -- Then recurse to it.
     put vFieldName & "_" into vFieldName
     do "put" && vFieldName && "into obj"
     return vWord(w-numChunks,obj)
     else
     -- Otherwise, read fails; return empty.
      return empty
     end if
  end if
end vWordR

function vItemR i,obj
 -- Returns item i of virtual object obj.
 global vFieldName
 put (last char of obj is "_") into continuedFlag
 if continuedFlag then delete last char of obj
 put the number of items of obj into numChunks
 -- Is it on this page?
 if (i ≤ numChunks)
 then
  -- Then perform the read operation.
  return item i of obj
 else
  -- Is there a continued page?
  if continuedflag
  then
    -- Then recurse to it.
   put vFieldName & "_" into vFieldName
   do "put" && vFieldName && "into obj"
   return vItem(i-numChunks,obj)
   else
   -- Otherwise, read fails; return empty.
    return empty
   end if
  end if
end vItemR

function vLineR l,obj
 -- Returns line l of virtual object obj.
 global vFieldName
 put (last char of obj is "_") into continuedFlag
 if continuedFlag then delete last char of obj
 put the number of lines of obj into numChunks
 -- Is it on this page?
 if (l ≤ numChunks)
 then
  -- Then perform the read operation.
  return line l of obj
 else
  -- Is there a continued page?
  if continuedflag
  then
    -- Then recurse to it.
   put vFieldName & "_" into vFieldName
   do "put" && vFieldName && "into obj"
```

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CARD

```
    return vLine(l-numChunks,obj)
    else
     -- Otherwise, read fails; return empty.
      return empty
    end if
  end if
end vLineR

function vCharR c,obj
 -- Returns char c of virtual object obj.
 global vFieldName
 put (last char of obj is "_") into continuedFlag
 if continuedFlag then delete last char of obj
 put the number of chars of obj into numChunks
 -- Is it on this page?
 if (c < numChunks) ¬
 or (c = numChunks and last char of obj ≠ "_")
 then
  -- Then perform the read operation.
  return char c of obj
 else
  -- Is there a continued page?
  if continuedflag
  then
   -- Then recurse to it.
   put vFieldName & "_" into vFieldName
   do "put" && vFieldName && "into obj"
   return vChar(c-numChunks,obj)
   else
    -- Otherwise, read fails; return empty.
     return empty
   end if
 end if
end vCharR

function vWordW w,obj,t,p
 -- Puts text t into, before, or after word w
 -- of virtual object obj.
 global vFieldName,maxfield
 put space into delim
 put (last char of obj is "_") into continuedFlag
 if continuedFlag then delete last char of obj
 put the number of words of obj into numChunks
 -- Is it on this page?
 if (w ≤ numChunks)¬
 or (w ≥ numChunks and not(continuedFlag))
 then
  -- Then perform the write operation.
  if p="before" then put delim after t
  if p="after" then put delim before t
  do "put t" && p && "word w of" && vFieldName
  -- Adjust for overflow as necessary.
 if length(obj)+length(t)>maxField
  then adjust "word"
  return word w of obj
 else
```

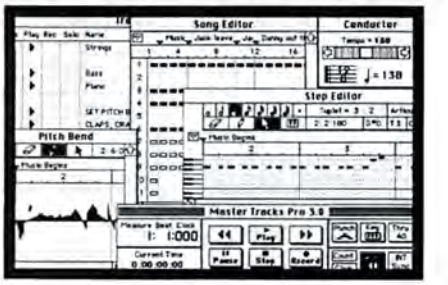
```
    -- Else recurse to continued page.
    put vFieldName & "_" into vFieldName
    do "put" && vFieldName && "into obj"
   return vWord(w-numChunks,obj,t,p)
  end if
end vWordW

function vItemW i,obj,t,p
  -- Puts text t into, before, or after item i
  -- of virtual object obj.
 global vFieldName,maxfield
 put "," into delim
 put (last char of obj is "_") into continuedFlag
 if continuedFlag then delete last char of obj
 put the number of items of obj into numChunks
  -- Is it on this page?
 if (i ≤ numChunks)¬
 or (i ≥ numChunks and not(continuedFlag))
  then
   -- Then perform the write operation.
   if p="before" then put delim after t
   if p="after" then put delim before t
   do "put t" && p && "item i of" && vFieldName
   -- Adjust for overflow as necessary.
  if length(obj)+length(t)>maxField
   then adjust "item"
   return item i of obj
 else
   -- Else recurse to continued page.
   put vFieldName & "_" into vFieldName
   do "put" && vFieldName && "into obj"
  return vItem(i-numChunks,obj,t,p)
 end if
end vItemW

function vLineW l,obj,t,p
  -- Puts text t into, before, or after line l
  -- of virtual object obj.
 global vFieldName,maxfield
 put return into delim
 put (last char of obj is "_") into continuedFlag
 if continuedFlag then delete last char of obj
 put the number of lines of obj into numChunks
  -- Is it on this page?
 if (l ≤ numChunks) ¬
 or (l > numChunks and not(continuedFlag))
  then
   -- Then perform the write operation.
   if p="before" then put delim after t
   if p="after" then put delim before t
   do "put t" && p && "line l of" && vFieldName
   -- Adjust for overflow as necessary.
  if length(obj)+length(t)>maxField
   then adjust "line"
   return line l of obj
 else
```

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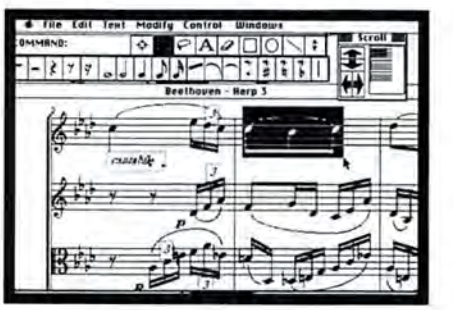


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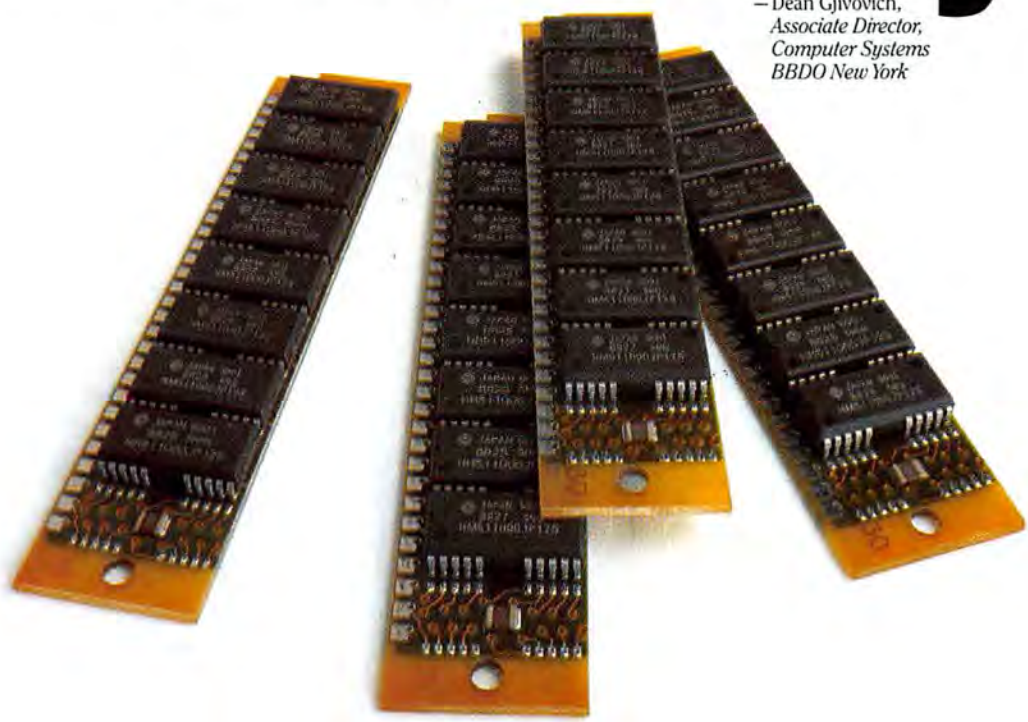

```
    -- Then recurse to continued page.
    put vFieldName & "_" into vFieldName
    do "put" && vFieldName && "into obj"
    return vLine(1-numChunks,obj,t,p)
  end if
end vLineW

function vCharW c,obj,t,p
  -- Puts text t into, before, or after character c
  -- of virtual object obj.
  global vFieldName,maxfield
  put (last char of obj is "_") into continuedFlag
  if continuedFlag then delete last char of obj
  put the number of chars of obj into numChunks
  -- Is it on this page?
  if (c ≤ numChunks) ¬
  or (c > numChunks and not(continuedFlag))
  then
    -- Then perform the write operation.
    do "put t" && p && "char c of" && vFieldName
    -- Adjust for overflow as necessary.
    if length(obj)+length(t)>maxField
    then adjust "char"
    return char c of obj
  else
    -- Else recurse to continued page.
    put vFieldName & "_" into vFieldName
    do "put" && vFieldName && "into obj"
    return vChar(c-numChunks,obj,t,p)
  end if
end vCharW

on adjust chunkType
  -- Moves the last chunk of type chunkType
  -- from one (full) actual field to the next.
  global vFieldName
  put "_" into continChar
  -- Delete & keep the last chunk from the field,
  -- then add a continuation character to the field.
  do "put last char of" && vFieldName && "into cc"
  if cc=continChar
  then do "delete last char of" && vFieldName
  do "put last" && chunkType && "of" && ¬
  vFieldName && "into theChunk"
  do "delete last" && chunkType && "of" && vFieldName
  if chunkType = "word"
  then do "put space after" && vFieldName
  do "put continChar after" && vFieldName
  -- Put the chunk at the start of next actual field.
  put continChar after vFieldName
  put "before" into p
  do "put" && vFieldName && "into obj"
  do "put v" & chunkType & "W(1,obj,theChunk,p)"
  delete last char of vFieldName
end adjust
```

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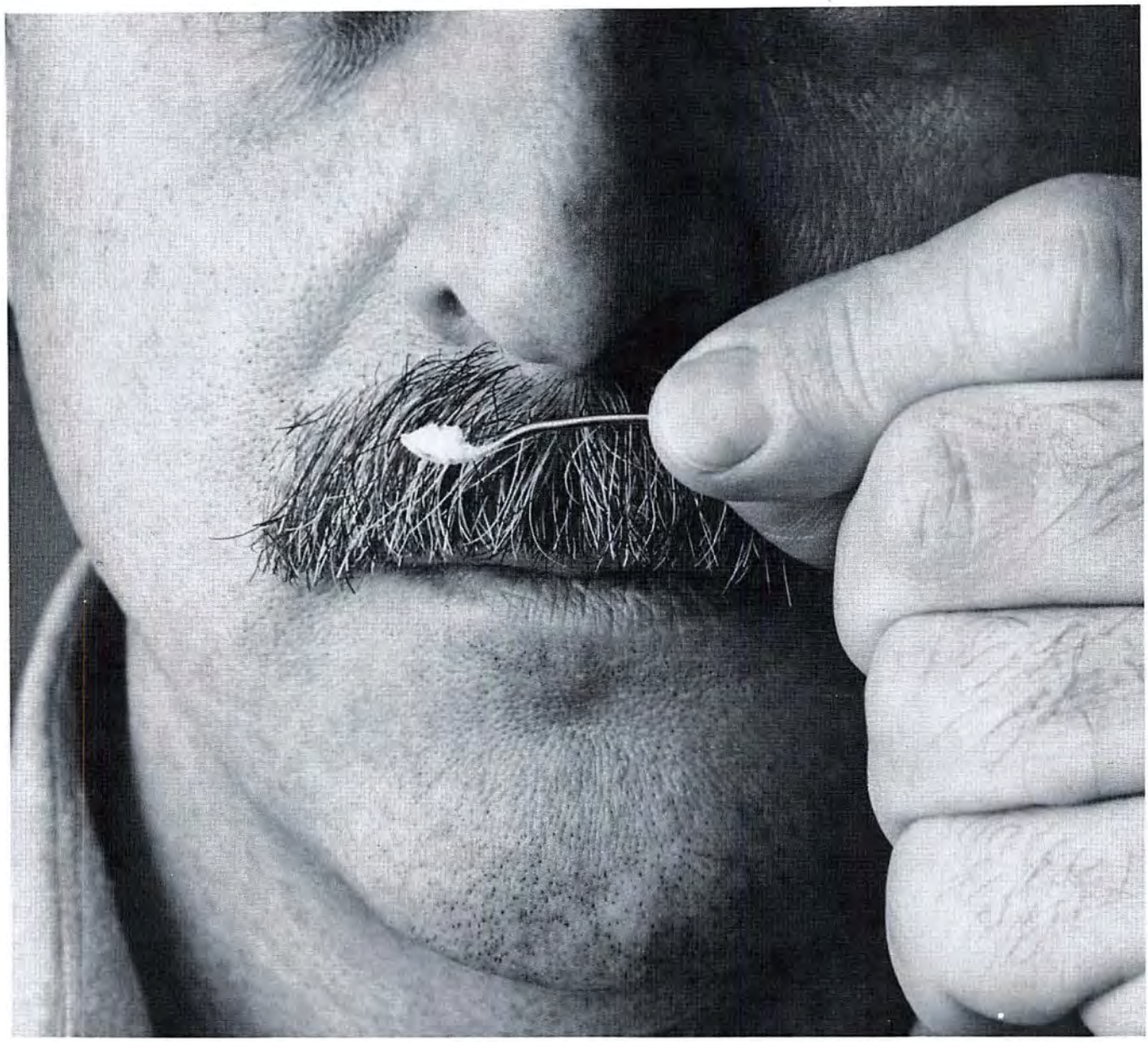
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A/UXILIARY INFORMATION

Wishing Upon a StarNine

Life with A/UX becomes more livable with this inexpensive package of utilities from StarNine

BY JAMES FINN



This month A/UXiliary Information begins more in-depth coverage of A/UX with a review of StarNine Utilities for A/UX. In the coming months we'll present news, product reviews, and articles to help both power users and novices get the most out of A/UX.

Apple's first release of A/UX is a respectably solid UNIX System V, but there are several things you wish it could do that it doesn't, such as toggle between A/UX and the Mac operating system at will. But even without that — promised in an upcoming update — there are other small annoyances that could be addressed.

If you want to copy a Macintosh file to the A/UX file system, you must first put it on a Macintosh File System (MFS) floppy (that's right, remember MFS and 400K disks?) and copy it from there. There is no easy way to copy files from A/UX to a Macintosh disk, and launching a Mac application from within A/UX often results in a hung system. You cannot capture screen images, nor is there a screen saver.

StarNine Utilities for A/UX is a package of seven utilities that solves all of the above problems and more. This package became indispensable to me as soon as I installed it. It lists for only $99; everyone with A/UX should have a look at it.

The utilities come with a manual and a one-page cover sheet that explains how to install them "when you can't wait to read the manual." Installation is simple and takes just a few minutes.

There are several ways to access the utilities. The most convenient way is to run *s9term,* which is Apple's *term* program modified to include a StarNine menu. *term* gives you the facility to create multiple resizable terminal windows, each with its own shell; running *s9term* gives you the same plus the StarNine Utilities always at hand. If you prefer, you can run the utilities alone by typing *starnine.*

Both *s9term* and *starnine* provide a Macintosh interface, complete with menus, dialog boxes and on-line help in windows. Additionally, you can access many of the utilities through A/UX commands, and installation creates entries for *man,* UNIX's on-line manual, for the new commands.

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Son of CP

A/UX ≪ = ≫ Mac, also known as the hierarchical file system transfer (HFX) utility, copies files between A/UX and Macintosh volumes and launches Macintosh applications that have been copied to A/UX. This utility displays a dialog that is reminiscent of the Font/DA Mover (see Figure 1).

A/UX files appear on the left with Macintosh files on the right. You can copy files in either direction. However, copying A/UX files directly to a Macintosh partition on a hard disk may trash the hard disk. Instead, you should copy A/UX files to a Macintosh floppy and later move the files to the hard disk when running the Mac operating system. The HFX utility does let you initialize Macintosh floppy disks.

Rusty Rahm, president of StarNine, explains that no problems have been reported with copying directly to Macintosh hard disk partitions, but even Apple recommends against it, principally because of potential incompatibilities with third-party drives.

When copying from A/UX to Macintosh, you have several options. For example, you can choose to set the Type and Creator of the target file. If you are copying a text file, you can translate newline characters to carriage return characters (in UNIX, newlines separate lines in a file, while carriage returns serve the same function in the Mac operating system).

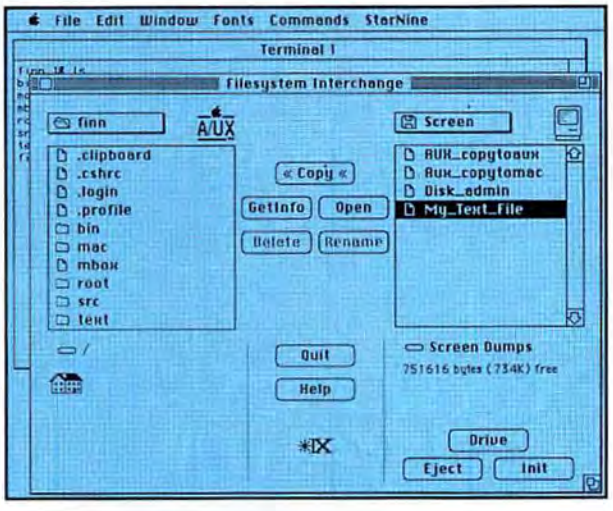


Figure 1: The HFX utility looks like the Font/DA Mover. A/UX files are on the left with Macintosh files on the right. Files can be copied in either direction, and you can initialize Macintosh floppy disks.

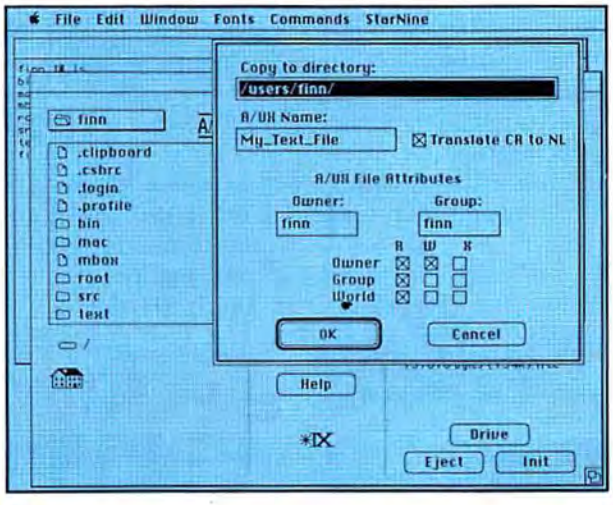


Figure 2: This dialog box is displayed when you copy a Macintosh file to A/UX. The permission bits initially checked match your current system mask (these are the permissions that are set by default whenever you create a new file in A/UX).

Although it is not documented, you must set the permission bits on an A/UX file to be publicly readable before you can copy the file to a Mac disk. For UNIX techies, this is because the utility runs with user ID set to *bin* in order to have permission to access the raw disk devices.

When you copy a Mac file to A/UX, your options include setting the permission bits of the target file and translating carriage returns to newlines for text files (see Figure 2). The copy is in AppleDouble format. This stores the resource fork of the Mac file in a separate A/UX file from the data fork, adding a percent character (%) to the beginning of the name of the resource file. A/UX filenames are limited to 14 characters in length, so the filename may be truncated during copying. However, HFX stores the original name in the resource fork and will restore it if you copy the file back to a Mac disk.

What's for Launch?

With A/UX 1.0, you must reboot your machine to switch between A/UX and the Macintosh operating system. However, you can launch a single Mac program with the A/UX Toolbox if it has first been copied to the A/UX file system. Unfortunately, Mac toolbox support from A/UX is still weak, and only particularly well-behaved programs can be launched successfully. A/UX comes with a launch facility, but StarNine's HFX utility adds pleasant improvements.

Suppose you have an untested Mac application and don't know whether it will run under A/UX. If there is a problem, it may hang up the terminal, forcing you to reboot the system. HFX lets you launch the application with a background timer set to regain control after two minutes, so you can test applications without danger.

Snap a Snapshot

When you select the Snapshot utility, you get a dialog box in which you set a timer to capture the screen image after a certain number of seconds or minutes. The image is saved in a compressed format that can accommodate any screen size.



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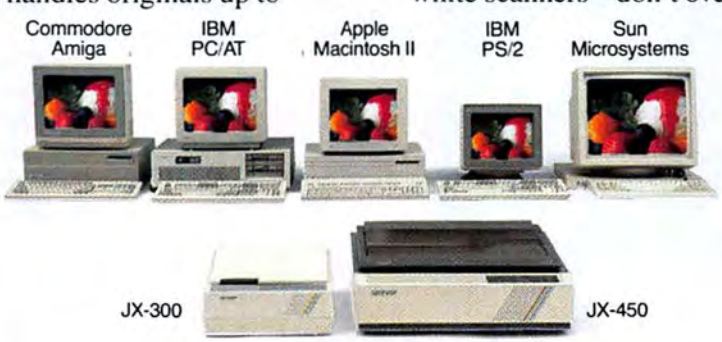
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Afterward you can return to the utility and view the snapshot. From there, you can select a MacPaint-sized portion of the screen image to save in a MacPaint file. This file can then be copied over to the Mac and edited further. The screen shots for this article were made with the Snapshot utility.

As a bit of icing on the cake, StarNine's launch facility will optionally take snapshots repeatedly at user-specified intervals after an application is launched. These images can be saved later as MacPaint files using the Snapshot utility.

Blank to You

The Screensaver utility blanks the screen and displays a roving StarNine icon after a chosen number of minutes of inactivity. Clicking the mouse or pressing any key restores the screen.

RAM Disk a la A/UX

StarNine includes a RAM disk utility to configure part of the memory as a disk. If you have enough memory to spare, storing frequently accessed files and programs on a RAM disk can improve performance dramatically. Installing the RAM disk generates a new UNIX kernel. The installation program lets you select from a list of common packages (C compiler, StarNine Utilities, and text processing programs) to include in the RAM disk.

The manual explains how system performance can also be improved by using the A/UX *kconfig* command to increase the number of disk buffers used by the kernel. Using a RAM disk is recommended only for systems of at least 8 megabytes.

Disk Tamers

The last three utilities help with disk management. Disk Admin gives a graphic view of the partitioning of your hard disks (see Figure 3). Look for Disks searches for unrecognized SCSI disks and makes them available. For example, if you power on a hard disk after booting A/UX, you can use Look for Disks to access it without having to reboot the system.

The final utility is Audit System. This works with configuration master list (cml) files, which is the file format used by A/UX's autorecovery system. Audit System gives you a simple way to perform some of the checks and fixes supported by autorecovery.

A cml file stores certain information about a set of files. Audit System compares this information to the current state of those files, reports any discrepancies, and optionally changes the files to match the description. Some of the items you can check include file ownership and group ownership, permission bits, file type (whether is it a directory or link, for example), and what other files the file is linked to.

StarNine Utilities includes a cml audit file for the utilities themselves, and a *mkcml* command that will create cml files for any set of files you choose. The audit facility would be particularly useful for someone maintaining a database of files on a network. Running an audit would quickly show whether someone had altered the permission bits of any essential files.

Wishing and Hoping . . .

Most of the utilities can be used both with A/UX commands and with the Mac interface via the StarNine menu. Surprisingly, some functions can be accessed in only one way. For example, you must use the Mac interface to use the HFX copy facility, and you must use the A/UX *mkcml* command to create new audit files.

It would be preferable if all functions could be accessed with either interface. I prefer the Mac interface for interactive work. Having commands for all the functions would enable you to include the functions in shell scripts.

StarNine is a UNIX software development and consulting company based in Berkeley, California. Their other projects include a TOPS server for A/UX and Mail*Link, a Macintosh to UNIX mail gateway program.

StarNine Utilities is a great collection of programs at a very reasonable price. StarNine plans to have the utilities available as DAs once Apple provides support for DAs in A/UX.

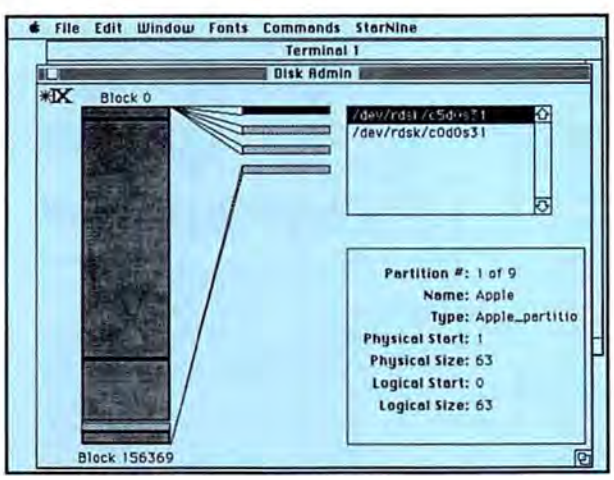


Figure 3: Disk Admin graphically displays the partitioning of your hard disk. Light gray partitions are Macintosh partitions, dark gray is for A/UX, and the current selection is highlighted.

MACUSER RATING

StarNine Utilities for A/UX ★★★★½

Follows Mac Interface	■ ■ ■ ■ ■
Printed Documentation	■ ■ ■ □ □
On-Screen Help	■ ■ ■ ■ □
Performance	■ ■ ■ ■ ■
Support	■ ■ ■ ■ ■
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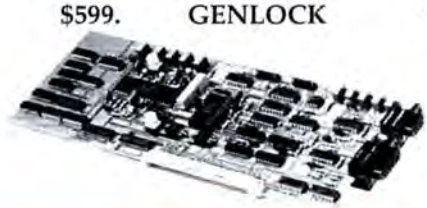
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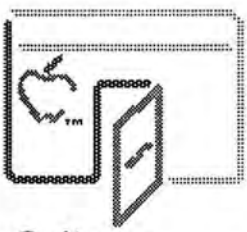
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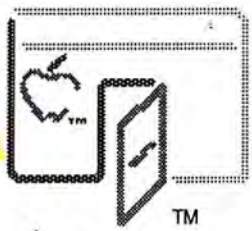


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UPDATES

Like a good wine, software changes over time. Admittedly, it's hard to keep up with all the new versions coming out, but it is important — it allows you to get the most out of your software. For those in the dark, here's a list of the most recent versions (as of press time) of many popular programs.

To see if you have the most current versions, check the About . . . item at the top of the Apple menu whenever you run a program.

In the realm of Apple System software, owners of 128K Macs should have System 2.0 and Finder 5.1.

For those with the 512K, 512KE, or XL, you should be running System 3.2 and Finder 5.3. Everyone else should be running System 6.0.2, which should be out by the time this hits the stands.

Some of the more significant updates as of press time are AppleShare 2.0 and QuarkXPress 2.0. Winging its way over AppleTalk networks is Falcon 2.0. QuickMail made some quick fixes with version 1.0.4.

All programs listed here are HFS compatible. From this chart, you can extract the following information: CP or NCP, copy protected or not; //, programs we've found to be Mac II compatible (not yet a comprehensive list); and S, for shareware (try before you buy).

Changes and new listings are in **bold.** Programs that appear to be compatible with the Macintosh II may not actually perform 100 percent of the functions they do on other Macintoshes, nor do they necessarily take full advantage of the Macintosh II.

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Acta	2.0	NCP,//
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Canvas	2	NCP,//
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CAT	2	NCP,//
Chart	1.02	NCP
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Clipper	1.01	NCP
CloseView	1.0	NCP
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DA Handler	6.0	NCP
Deluxe Music Construction Set	2.0	CP
Design/IDEF	1.1	NCP,//
DesignScope	1.14	NCP,//
DeskLink	2.0	NCP,//
Disk Express	1.10	NCP
Disk First Aid	1.4	NCP
DiskFit	1.4	NCP,//
DiskInfo	1.45	NCP,S
Disk Ranger	3.1	NCP
Disk Tools Plus	1.01	NCP,//
DiskTop	3.03	NCP,//
Dollars & Sense	4.0	NCP,//
Double Helix II	r40	NCP,//
"Draw it Again, Sam"	2.04	NCP,//
Easy Access	1.0	NCP
Easy3D	1.01	NCP
Edit	2.1	NCP
Excel	1.5	NCP,//
ExperCommon Lisp	2.2	NCP
ExperLisp	1.5	NCP,//
ExperLogo	1.1	NCP
Expressionist	2.0.3	NCP,//
EZ Draft	2.0	NCP,//
Falcon	2	NCP,//
FastBack	1.02	NCP,//
File	2.0	NCP,//
Filemaker II	1	NCP,//
Finder (HFS)	6.1	NCP
Finder (MFS-128K)	4.1	NCP
Findswell	2.0	NCP,//
1st Aid Kit-HFS	2.5	NCP,//
FlashBack	1.6	NCP
Flight Simulator	1.0	CP
Fokker Triplane	1.0	CP
FONTastic Plus	2	NCP,//
Font/DA Mover	3.8	NCP
Fontographer	2.3	CP
FontShare	1.1	NCP,//
Forecast	2.0	NCP,//
4th Dimension	1.0.6	NCP,//
FoxBASE+/Mac	1.10	NCP,//
Frame Mac	1.1	NCP,//
FreeHand	2.0	NCP,//
FreeTerm	2.0	NCP,//
FullPaint	1.0	NCP
FullWrite Professional	1.0	NCP,//
Gato	1.42	CP
General	3.3	NCP
GeoQuery	1.01	NCP,//
Glue	1.04	NCP
GraphicWorks	1.13	NCP
Handwriting Analyst	1.2	NCP,//
Hard Disk 20	1.1	NCP
Hard Disk Utility	2.0	NCP
HD Backup	1.1	NCP
HD SC Setup Apple	2.0	NCP
HFS Backup	1.1	NCP
HFS Locator Plus	2.0	NCP
HyperCard	1.2.1	NCP,//
HyperDA	1.1	NCP,//
Icon-It!	1.1	NCP,//
Illustrator	1.0	CP/NCP,//
ImageWriter	2.7	NCP
ImageWriter, AppleTalk	2.7	NCP
ImageWriter LQ	2	NCP,//
ImageWriter LQ, AppleTalk	2	NCP,//
InBox	3.0	NCP,//
Insight Expert Accounting	2.01	NCP,//
Installer	2.6	NCP
inTalk	3.0	NCP,//
Interleaf Publisher	3.5	CP,//
Jam Session	1.1	CP,//
Jazz	1A	CP
JustText	1.1	NCP
Keyboard	3.3	NCP
Key Layout	2.3	NCP,//
Language Systems FORTRAN	1.2	NCP,//
Laser Author	1.3	NCP,//
LaserPaint	1.9	NCP,//
Laser Prep	5.2	NCP
LaserShare	1.0	NCP
LaserSpeed	1.6	NCP,//
LaserStatus	2.0	NCP
LaserWriter	5.2	NCP
LaserWriter IISC	1.1	NCP
Layout	1.3	NCP,S
Legal Billing	1.72	NCP,//
Legal Billing II	2.39	NCP,//
LightSpeedC	3.0	NCP,//
LightSpeed Pascal	2.0	NCP,//
Listen 2.0	2.1	CP,//
Lode Runner	1.0	CP
Lookup	1.0c	NCP,//
Mac3D	2.1	NCP,//
MacASM	1.2	NCP
MacBillboard	4.01	NCP,S
Mac C	5.0	NCP,//
MacCalc	1.2	NCP
Mac Daisy Link	1.04	NCP,//
Mac Disk Catalog II	2.1c	NCP
MacDraw II	1.0	NCP,//
MacDraft	1.2b	NCP,//
MacFlow	2.04	NCP,//
MacFortran (all)	2.4	NCP,//
MacFortran / A/UX	1.0	NCP,//
MacGolf Classic	3.0	CP,//
MacInTalk	1.1	NCP
MacLabeler	2.2	CP
MacMoney	3.01	NCP,//
MacMovies	1.02	NCP
MacNosy V2	2.8	NCP
MacPaint	2.0	NCP,//
MacPalette	1.0	CP
MacPascal	2.1	CP
MacProject II	1.0	NCP,//
MacProof	3.0	NCP
MacSafe	1.08	NCP,//
MacSchedule	1.1	CP,//
MacScheme+ Toolsmith	1.51	NCP,//
MacServe	2.3	CP,//
MacSpec	1.3	CP
MacSpin	1.1	CP
MacSpool	3.0	NCP,//
MacTerminal	2.3	NCP,//
MacTools (MFS/HFS)	7.1	NCP
MacWrite	5.0	NCP,//
Mac Zap	5.0	NCP,//
MailManager	1.0	CP
Map	1.1	NCP
MapMaker	3.0	NCP,//
Mavis Beacon Teaches Typing!	1.2	NCP,//
MDA	2.0	NCP,//
MDS	2.0	NCP
Measure Test	12.7	CP,S,//
Megamax C	3.0	NCP
MenuFonts 2	2.0	NCP,//
MGMStation CAD	2.5	NCP,//
MicroPhone II	2	NCP,//
Micro Planner Plus	6.0	NCP,//
MindWrite	2.0	NCP,//
miniWriter	1.4	NCP,S
MockPackage+	4.3.4	NCP,S
Modern Artist	2.0	NCP,//
MORE	II	NCP,//
Mouse	3.3	NCP
MPW	2.0b	NCP
MS BASIC	3.0	NCP
MS BASIC Compiler	1.0	NCP
MS Fortran	2.2	NCP
MS Works	1.1	NCP,//
MultiFinder	6.0	NCP,//
Multiplan	1.11	NCP,//
MusicWorks	1.1	CP
myDiskLabeler	2.11	NCP,//
'Ncryptor	2.0	NCP,//
Neon	2.0	NCP
NightWatch	1.02	NCP,//
Omnis III Plus	3.3	NCP,//
On Cue	1.3	NCP,//
Orbiter	1.2	NCP,//
OverVUE	2.1e	NCP,//
PageMaker	3.0	NCP,//
Parameter Manager Plus	2.2	NCP,//
Performer	2.31	CP
PictureBase	1.2	NCP
Plains and Simple	4.1	NCP,//
PLP	2.0	NCP,//
PowerPoint	2.0	NCP,//
PowerStation	2.5	NCP,//
Print Monitor	1.2	NCP,//
Professional Composer	2.1	CP
Profit Stalker II	1.3	NCP
Programmer's Online Companion	2.0	NCP,//
Project Billing	3.0	NCP,//
Pyro!	3	NCP,//
QuarkStyle	1.0	NCP,//
QuarkXPress	2.0	NCP,//
QUED/M	2.07	NCP,//
QuicKeys	1.1	NCP,//
QuickMail	1.0.5	NCP,//
QuickWord	2.0	NCP,//
Rags to Riches	3.0	CP,//
Ragtime	2.01	NCP,//
Read-It!	2.0	NCP,//
Ready, Set, Go!	4.5	NCP,//
Record Holder	2.1	NCP
REdit	1.2	NCP
Red Ryder	10.3	NCP
Reflex Plus	1.01	NCP,//
Reports	1.2	NCP,//
ResEdit	1.1b7	NCP,//
Sargon III	1.0	CP
Scoop	1.01	NCP,//
Scrapbook	2.4	NCP,//
Sensible Grammar	1.1d	NCP,//
SideKick	2.0	NCP
Silicon Press	1.1	NCP
Slide Show Magician	1.3	CP
Smartcom II	3.0a	NCP,//
SmartScrap & The Clipper	1.03	NCP,//
Sound	3.3	NCP,//
SoundCap	4.4	CP
Space Edit	2.0	CP,//
SpellNow	1.0	NCP
Spellswell	2.0f	NCP,//
Startup Device	3.3	NCP,//
StatView 512+	1.1	NCP
StatWorks	1.2	NCP,//
Stella	1.3	CP,//
Stepping Out II	2.01	NCP,//
Straight Talk	2.08	NCP,//
Studio Session	1.4	CP
Suitcase	1.2.1	NCP,//
Suitcase II	1.2	NCP,//
SuperGlue	1.03	NCP,//
SuperPaint	1.00	NCP,//
Switcher	5.1	NCP
Systat	3.2	NCP
System (HFS)	6.0.2	NCP,//
System (MFS-128K)	2.0	NCP
Telescape	1.0	NCP,//
Telescape Pro VT 100	1.1	NCP
Tempo II	1.1	NCP,//
Tetris	1.1	NCP,//
Textures	1.01	NCP,//
Think 'n Time	2.0	NCP,//
ThinkTank	2.0	NCP,//
Thunder!	1.0.1	NCP
Thunderscan	4.0	NCP
TML Pascal	2.01	NCP
TMON	2.8	NCP
Top Desk	3.0	CP
TOPS	2.0	NCP,//
Trapeze	2.1	NCP,//
Turbo Download	2.1	NCP,//
Turbo Maccountant	2.0	NCP,//
Turbo Pascal	1.1	NCP,//
Type Now	1.0	NCP,//
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VersaTerm	3.0	NCP
VersaTerm Pro	2.0	NCP
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VIP	2.5	NCP,//
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Word	4.0	NCP,//
WordPerfect	1.0.1	NCP,//
Write	1.0	NCP,//
WriteNow	1.07	NCP,//
ZBasic	4.0	NCP

MINIFINDERS



Have you often wished for a personal assistant to help in picking software? These MiniFinders may not breathe and move, but they do tell you what products are hot and, better, what these products do. Each of these items has been carefully reviewed and selected by the *MacUser* editorial staff. Each has been rated in increments of half mice, from 1 to 5. Ratings are relative within categories, and they can change as categories expand and new products advance the state of the art. You won't see many low ratings or bombs, since we're telling you about the cream of the crop, but we will warn you about the really bad products so that you don't spend your money on them. Red names indicate this month's additions. letters at the end of the entries indicate whether a product is copy protected (CP) or not (NCP). If a product has been reviewed or Quick Clicked in *MacUser*, the date of the review is shown. Eddy (Editor's Choice) Award winners are noted with a ★ and the year in which they won prizes for an excellent product. Next time you have to find products you can count on, count on *MacUser*!

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BUSINESS ACCOUNTING

Accountant, Inc. integrates accounts payable, accounts receivable, general ledger, and inventory modules. Prints checks, purchase orders, invoices, customized reports. Bare-bones accounting system limited in size and scope, but ease of use and integration make it suitable for small businesses. Requires 512K+. Version 2.0. $299. SoftSync, 162 Madison Ave., New York, NY 10016. NCP (Oct '87)
★★★

Back to Basics Accounting is a powerful double-entry accounting software package for the small business user with GL, AR, and AP modules. Exhaustive manual with numerous examples. Report capabilities are excellent. $199. Peachtree, 4355 Shackleford Road, Norcross, GA 30093. NCP (May '87)
★★★★

BPI General Accounting is an easy-to-use system. Six journals, AR, AP, Payroll, and GL on one disk. Offset amounts automatically post to ledgers. Up to 8000 accounts. Detailed records, wide range of reports. Requires 512K+. $249. BPI Systems, 3001 Bee Cave Road, Austin, TX 78746. NCP (Aug '86)
★★★★

Insight is a high-powered accounting program for the small-to-medium-sized business. Modules include Accounts Receivable, Payables, and General Ledger; others are in the works. Requires 512K and hard disk. $595. Layered, 529 Main St., Boston, MA 02129. NCP (Dec '86) ★'86 Eddy
★★★★½

Rags to Riches integrated accounting modules (General Ledger and Accounts Receivable) uses Mac interface to the hilt. Information entered in one window automatically transfers. Detailed, flexible report options. Very easy to use, but it can be confusing with several windows on-screen. Requires 512K+ and printer. $199.95 per module. Chang Labs, 5300 Stevens Creek Blvd., San Jose, CA 95129. NCP (Dec '85)
★★★★½

Rags to Riches Professional Billing tracks and bills professional services. Batches activities for individual timekeepers. Use as stand-alone, or integrate with R to R modules. Requires 512K+, printer. $399.95. Chang Labs, 5300 Stevens Creek Blvd., San Jose, CA 95129. NCP (Feb '87)
★★★★

Simply Accounting has six ledgers and eight journals to handle the needs of most small-to-medium sized businesses. Better Mac interface than most. Payroll tax labels can't be modified, which forces you to subscribe to Bedford's yearly update service. Version 1.03. Requires 1 megabyte. $349. Bedford Software, 15311 N.E. 90th St., Redmond, WA 98052. NCP (Sept '88)
★★★★

Strictly Business General Ledger features clear, well-outlined setup procedures and operations. Very flexible, up to 99 profit centers with up to 100 departments each, and customized reports. Program print spools. Requires 512K+, printer and external drive. $395. Future Design, 13681 Williamette Drive, Westminster, CA 92683. NCP (Dec '85) ★'85 Eddy
★★★★

Timeslips III tracks billing and expense information for people who charge by the hour. DA turns the clock on and automatically bills a client when a session is over. Version 1.06. Requires 512K and two disk drives. Mac II and MultiFinder friendly. $199.95. North Edge Software, 239 Western Ave., Essex, MA 01929. NCP (Sept '88)
★★★★½

PERSONAL FINANCE

Dollars & Sense is a bookkeeping program. Easy to use, with a good manual and excellent on-screen help. Will handle up to 120 separate accounts or money categories. Uses standard double-entry accounting techniques. Will work on 128K. $149.95. Monogram, 8295 S. La Cienega Blvd., Inglewood, CA 90301. CP (Mar '87)
★★★

MacInTax is an excellent tool for preparing tax forms. Intuitive, easy-to-use. Accepts data from leading personal finance programs. Good built-in help. Liberal upgrade policy for current owners. California forms set also available. $119 federal; $65 California. SoftView, 4820 Adohr Lane, Suite F, Camarillo, CA 93010. NCP (Mar '87) ★'86 Eddy
★★★★★

MacMoney is a financial manager that uses information gleaned from your checks and deposit slips. Produces a variety of reports and graphs. Version 3.1 reviewed. Requires 512KE and printer. $119.95. Survivor Software, 11222 La Cienega Blvd., Inglewood, CA 90304. NCP (July '88) ★'86 Eddy
★★★★

Quicken helps you write checks, then keeps a ledger showing you where all of your money goes. Tax information is automatically generated. Version 1.0. Requires 512K and printer. $49.95. Intuit, 540 University Ave., Palo Alto, CA 94301. NCP (Nov '88)
★★★★★

Wall Street Investor spots stock market trends. Downloads information from an electronic service. Good charting ability. Previously known as Market Pro. Version 2.1. Requires 1 megabyte, two 800K drives or hard disk, Hayes-compatible modem, and an I.P. Sharp account. $495. Pro Plus Software, 2150 East Brown Road, Mesa, AZ 85203. NCP (Oct '88)
★★★★

DATABASES

Business Filevision is a graphic database. Much more powerful than the original, accepts MacPaint graphics. $395. Marvelin, 3420 Ocean Park Blvd., Santa Monica, CA 90405. NCP (Feb '86)
★★★

C.A.T. is a dedicated relational database for managing contacts, activities and time. Links between types of data make it easy to keep track of important people and events. $399.95. Chang Laboratories, 5300 Stevens Creek Blvd., San Jose, CA 95129. NCP (Nov '87)
★★★★

dBASE Mac is a relational DBMS that includes a structured programming language to develop stand-alone applications. Palette icons as alternatives to menu commands will help novice users. Requires 1 megabyte +. $495. Ashton-Tate, 20101 Hamilton Ave., Torrance, CA 90502-1319. NCP (Feb '88)
★★★★

Double Helix II is a powerful database that supports a multiuser environment with an upgrade. Uses an icon-based development system for easy creation of databases. $595, single-user version. Odesta, 4084 Commercial Blvd., Northbrook, Ill 60062. NCP (Apr '88)
★★★★½

EndNote provides database management for bibliographies. Designed to work in conjunction with a word processor. Allows for formatted in-text citations to be pasted directly into a word-processing document and then creates a bibliography from the citations. Version 1.0 reviewed. $129. Niles & Associates, 2200 Powell St., Suite 765, Emeryville, CA 94608. NCP (Feb '89)
★★★★½

FileMaker II is a multiuser version of the all-time best flat file manager for the Macintosh. New features include more flexible layouts, hierarchical menus, and color on the Mac II. Version 1.0. Requires 1 megabyte with
★★★★½

MINIFINDERS



two 800K drives or a hard-disk drive. $299. Claris, 440 Clyde Ave., Mountain View, CA 94043. NCP (Dec '88)

4th Dimension is a versatile tool that creates stand-alone relational databases. ★★★★½ Design and layout environments allow easy linking of information. Robust. Pascal-like procedure language. $695. Acius, 20300 Stevens Creek Blvd., Cupertino, CA 95014. NCP (Nov '87) ★'87 Eddy

FoxBASE+/Mac is a relational database that can read unmodified dBASE III ★★★★½ PLUS applications created in the MS-DOS world. Amazingly fast. Good implementation of dBASE on the Mac. Version 1.0. Requires 1 megabyte. Mac II and MultiFinder friendly. $395. Fox Software, Inc., 118 W. South Boundary, Perrysburg, OH 43551. NCP (Sept '88)

MacDewey! is a cataloging program featuring the Dewey Decimal Classification ★★★ system. Uses predefined fill-in-the-blank fields to create catalog cards. Suffers from bugs in search routines and the inability to distinguish first names. Not for professionals; home libraries might benefit. Version 2.5. $79.95. Mousetrap Software, 336 Coleman Drive, Monroeville, PA 15146. NCP (Nov '87)

Omnis 3 is a power database, featuring concurrent-multiple-file management. ★★★★ Can handle 24 files, 12 at a time, and is fully relational. Create custom environments, including user-defined menus, commands, and dialogs. $495. Blythe, 2929 Campus Drive, San Mateo, CA 94403. NCP (Mar '86)

OverVUE is a power-packed relational database that has extensive sorting, sum- ★★★★½ marizing, and report generation capacity. Has macros, and a charting function. Good manual. It can exchange files with a very wide variety of other programs (including IBM software). $295. ProVUE, 222 22nd St., Huntington Beach, CA 92648. NCP (Nov '85) ★'85 Eddy

Pro-Cite is a complete database-management system for bibliographies. Almost ★★★½ unlimited flexibility in the formatting of bibliographies. Full-featured search and sort capabilities. Version 1.3 reviewed. Requires 512KE. $395. Personal Bibliographic Software, Inc., P.O. Box 4520, Ann Arbor, MI 48106. NCP (Feb '89)

Record Holder Plus is a flexible, easy-to-use, form-oriented data manager. Setup ★★★★ is particularly simple and the search features are powerful. $69.95. Software Discoveries, 137 Krawski Drive, South Windsor, CT 06074. NCP (Apr '86) ★'87 Eddy

Reflex for the Mac is a flexible relational database. Excellent report generator ★★★★½ gives full control over appearance, style of output. Requires 512K+, second drive, or hard disk. $99.95. Borland International, 4585 Scotts Valley Drive, Scotts Valley, CA 95066. NCP (Dec '86) ★'86 Eddy

Reflex Plus is a relational database with "smart" entry, and report design, but no ★★★★ overall programming facility. Simple to set up, yet fast. Graphic capabilities are quite limited. Version 1.0 reviewed. $279. Borland/Analytica, 4585 Scotts Valley Drive, Scotts Valley, CA 95066-9987. NCP (Feb '88)

Writer's Workshop maintains orderly records for writers. It can track manuscripts, ★★★½ income, and publisher. Based on and includes Runtime Helix. $99.95. Futuresoft System Designs, P.O. Box 132, New York, NY 10012. NCP (Apr '87)

NUMBER CRUNCHING

Data Desk Professional lets you visually look at statistics with more ease than ★★★★½ any comparable Macintosh program. Plots variables so you can analyze data to see what patterns develop. Version 2.0. Requires 1 megabyte and two 800K disk drives or hard disk. $495. Odesta, 4084 Commercial Ave., Northbrook, IL 60062. NCP (Nov '88)

Excel is THE power spreadsheet of the Mac. Has 256-column by 16,384-row ★★★★★ capability. Features include a powerful macro function (with a recorder to make creation simple) and elaborate charting facilities. 512K+ Mac and external drive required. $395. Microsoft, 16011 N.E. 36th Way, Redmond, WA 98073-9717. NCP (Prem) ★'85 Eddy

MacCalc is a fast, competent, full-featured spreadsheet with impressive built-in ★★★★ functions, font control, on-line help, ability to expand columns and rows, and read/write SYLK or WKS files. The worksheet is 125 columns by 999 rows. A very flexible, pure spreadsheet. $139. Bravo Technologies, c/o DPAS, P.O. Box T, Gilroy, CA 95021. NCP (Sept '86) ★'86 Eddy

MacSpin is a unique and powerful graphic data analysis program. Handles multi- ★★★★ variate data in a highly visual manner. Nothing else like it for any micro. $199.95. D² Software, P.O. Box 9546, Austin, TX 78766-9546. CP (June '86) ★'87 Eddy

MacSQZ! compresses Excel files up to 88 percent of their actual size. Good to free ★★★★★ up disk space. Also contains password utility. MultiFinder hostile. Requires Excel. Version 1.01. $79.95. Turner Hall Publishing, 10201 Torre Ave., Cupertino, CA 95014. NCP (Aug '88)

Mathematica is a powerful tool for doing all kinds of math. Offers arbitrary-preci- ★★★★½ sion numeric calculations, symbolic computation, PostScript graphics, and programmability. Version 1.03. Requires 1 megabyte+ and a hard-disk drive. 2 megabytes RAM required to run kernel. $495, $795 for the Mac II version. Wolfram Research, P.O. Box 6059, Champaign, IL 61821. NCP (Nov '88)

MathView Professional is an equation solver that combines two- and three- ★★★★ dimensional plotting with routines for matrices, differential equations and integrals, complex numbers, and the like. Interface leaves a lot to be desired. Version 1.0. Requires 512KE and two disk drives. Mac II and MultiFinder friendly. $249.95. BrainPower, 24009 Ventura Blvd., Calabasas, CA 91302. NCP (Sept '88)

Microtemp Financial Calculators is a set of worksheets for Excel and Works that ★★★½ calculates common personal and small business financial problems. Includes cash flow, real estate and rate of return calculators. Version 1.0. $79.95. Microtemp, P.O. Box 1208, Santa Rosa, CA 95402. NCP (Aug '88)

Mindsight is a professional level, decision-support, and business planning pack- ★★★★ age. Can work with IFPS on mainframes, and is able to transmit models in both directions. Powerful and easy to use. Requires 512K+. $249. Execucom Systems, P.O. Box 9758, Austin, TX 78766. CP (Dec '86)

Parameter Manager Plus is a data manager, incorporating integrated scheduling, ★★★★ statistics, and graphics. Solid spreadsheet, calendar, and database functions. Can import data from Excel or Lotus 1-2-3. $595. Rebus, 2330-B Walsh Ave., Santa Clara, CA 95051. NCP (July '87)

StatView 512+ is a very intuitive statistical analysis program with tools needed ★★★★★ to understand any set of data. Holds data in a spreadsheet-like form. Full-featured, fast, and accurate. Extremely wide range of analyses possible. Requires 512K+ and 800K of disk space to operate. $349.95. BrainPower, 24009 Ventura Blvd., Calabasas, CA 91302. NCP (Dec '86)

StatView II is a remarkably complete data analysis package. Essential for any kind ★★★★★ of descriptive, comparative, or multivariate statistics. Works in color on the Mac II. Version 1.01. Requires Mac II or SE equipped with 68020 and 68881 math coprocessor; two 800K disk drives or hard disk. $495. Abacus Concepts, 1984 Bonita Ave., Berkeley, CA 94704. NCP (Oct '88)

101 Macros for Excel offers all the power of macros without having to learn how ★★★★ to write them. Some gems include a macro to transpose rows and columns, and a search and replace macro. Requires Excel. $69.95. Macropac International, 19855 Stevens Creek Blvd., Cupertino, CA 95014. NCP (July '88)

GRAPHICS & DESIGN

ArtWare: Borders enables you to customize your own clip art disk. The border ★★★★ collection is the best package in terms of quality of art. Other packages available. Requires a program that reads Encapsulated PostScript Format (EPSF) files. $129. Artware Systems, 3741 Benson Drive, Raleigh, NC 27609. NCP (Aug '88)

Canvas is a Draw and Paint program that uses QuickDraw as its output language. ★★★★½ Full of features, including free rotation and one-and-two-point perspective. Also has graphics macro commands, unusual in a program this inexpensive. $295. Deneba, 7855 N.W. 12th St., Suite 202, Miami, FL 33126. NCP (Jan '88)

Chart can easily create area, bar, column, line, pie, scatter, and combination ★★★½ charts. A total of 42 styles are provided. Limited to 100 data items (64 in a series) on a 128K Mac, approximately twice that on a 512K Mac. $125. Microsoft, 16011 N.E. 36th Way, Redmond, WA 98073-9717. CP

Click & Clip offers seasonal graphics packages. Of the two quarterly editions ★★★ released, the Spring '88 package is the better collection. Requires a program that reads Encapsulated PostScript Format (EPSF) files. $39.95 per edition. Studio Advertising Art, P.O. Box 18432-52, Las Vegas, NV 89114. NCP (Aug '88)

Comic Strip Factory is an assembly program for creating comic strips. Includes a ★★★★½ database of parts for various characters and backgrounds for panels. Good text editing in balloons. Can import and export in MacPaint format. $69.95. Foundation Publishing, 5100 Eden Ave., Suite 307, Edina, MN 55436. NCP (Dec '87)

Cricket Draw is an object-oriented drawing program that will produce stunning, ★★★½ high-quality output. Designed to print on PostScript-compatible devices, such as the LaserWriter. $295. Cricket Software, 40 Valley Stream Parkway, Malvern, PA 19355. NCP (May '87)

Cricket Graph easily generates 12 graph types. Multiple windows can be dis- ★★★★★ played. Graph prints in up to eight colors with up to 16 patterns. Self-generating macro formatting. Switcher, HFS, LaserWriter, and plotter compatible. $195. Cricket Software, 40 Valley Stream Parkway, Malvern, PA 19355. NCP (June '86) ★'86 Eddy

Cricket Presents is a presentation tool with strong emphasis on graphics. Good ★★★★ master template. Lacks import capability for text. Version 1.0. Requires System 4.2 or later. $695. Cricket Software, 40 Valley Stream Parkway, Great Valley Corporate Center, Malvern, PA 19355. NCP (Nov '88)

Crystal Paint creates an electronic kaleidoscope. It is MacPaint's Brush Mirrors ★★★★ gone wild in a small, simple, yet wonderful application. Does not work in color on Mac II. MultiFinder friendly. Requires 512K+. $49.95. Great Wave Software, 5353 Scotts Valley Drive, Scotts Valley, CA 95066. NCP (Feb '88)

MINIFINDERS

Curator catalogs your art and graphics so it's easy to see what's what and where it is. Supports PICT, TIFF, EPSF, PostScript, MacPaint, and more. Changes creator types. Requires 512K and an 800K drive. $139.95. Solutions International, 30 Commerce St., Williston, VT 05495. NCP (Sept '88)

DeskPaint is a full-blown paint program as a desk accessory. Allows you to spruce up a graphic while in another application. Imports and exports MacPaint and TIFF images. Great for DTP, but not enough features to rival the leaders in paint programs. Zedcor, 4500 E. Speedway, Tucson, AZ 85712-5305. NCP (Mar '88)

EPS Illustrations is a potpourri of illustrations with no real focus. As an art package, this one is not very useful as you cannot alter any of the drawings. Requires a program that reads Encapsulated PostScript Format (EPSF) files. $129.95. T/Maker, 1973 Landings Drive, Mountain View, CA 94043. NCP (Aug '88)

EZ Draft is a high-level CAD application. Does things usually only found on minicomputer programs. Uses "pop-up" menus to supplement a full set of pull-down menus. Comes with an additional set of printer/plotter/monitor drivers. A real powerhouse. $1995. $500 for IEGS module to link to other CAD programs. Bridgeport Machines, 500 Lindley St., Bridgeport, CT 06606. CP (May '87)

FastForms! Construction Kit is both a fast and efficient business forms creator (a drawing program) and a specialized application (and DA) to fill out the data fields in your forms. $149 (U.S.). Shana Enterprises, Advanced Technology Center #105, 9650-20 Ave. Edmonton, Alberta T6N 1G1, Canada. NCP (Nov '87)

Fluent Fonts is a two-disk collection of fonts. Forty-nine different items are included. All install easily in user systems. Most are well executed and some are extraordinarily nice. This is a real bargain for font lovers. $49.95. Casady-Ware, P.O. Box 223779, Carmel, CA 93922. NCP

Fontastic is a font editor that features a large editing window with a grid to make positioning easy. Select letters to edit by clicking on a matrix of the font. Allows scaling of existing fonts and previewing the various styles. $49.95. Altsys, P.O. Box 865410, Plano, TX 75086. NCP (Dec '85)

Fontographer is a complex, but excellent laser font creator. The fonts created have 300 bits-per-inch resolution. The fonts are actually downloadable PostScript files. $395. Altsys, P.O. Box 865410, Plano, TX 75086. CP

FreeHand greatly simplifies the drawing of curves, the use of layers and text handling when manipulating PostScript graphics. And it works in color on the Mac II. Requires 1 megabyte and two disk drives. $495. Aldus, 411 First Avenue South, Seattle, WA 98104. NCP (Aug '88)

FullPaint is an expanded version of MacPaint. Features include full-screen drawing, up to four documents open simultaneously, brush editing, and movable tool palettes. $99.95. Ashton-Tate, 20101 Hamilton Ave., Torrance, CA 90502-1319. NCP (June '86) ★'86 Eddy

GraphicWorks 1.1 is a powerful drawing and painting program that creates high-resolution bit-maps. Easels contain graphics, balloons hold text, and both reside on panels. Graphic primitives are now a separate tool. $149.95. Mindscape, 3444 Dundee Road, Northbrook, IL 60062. NCP (Oct '87)

Illustrator 88 is a professional-level graphics program from the people who defined the PostScript language. Uses templates for precise drawing and detailed artwork. Requires 1 megabyte. $495. Adobe Systems, 1585 Charleston Road, Mountain View, CA 94039. NCP (Oct '88)

Image Club is an overwhelming collection of EPS clip art available on disk and CD-ROM. Comes with a well-designed catalog of images. Requires a program that reads Encapsulated PostScript Format (EPSF) files. $99. Image Club Graphics, 2915 19th St. N.E., Calgary, Alberta, Canada T2E 7A2. NCP (Aug '88)

ImageStudio puts a photo-retouching lab on the desktop. Editable brushes let you modify digitized images in 65 gray levels. Version 1.0 reviewed. Requires 1 megabyte + and two 800K disk drives. Mac II and MultiFinder friendly. $495. Letraset USA, 40 Eisenhower Drive, Paramus, NJ 07653. NCP (June '88)

Images with Impact! brings clip art out of the turn-of-the-century woodcut style and into a modern graphic sensibility. "Graphics and Symbols 1" is the first in a series. Requires a program that reads Encapsulated PostScript Format (EPSF) files. $99.95. 3G Graphics, 11410 N.E. 124th St., Kirkland, WA 98034. NCP (Aug '88)

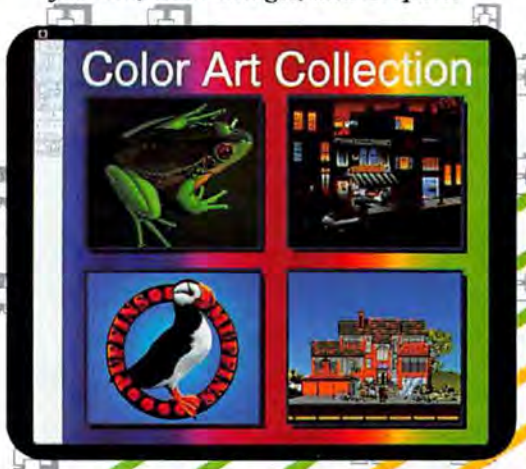
Japanese Clip Art is a two-disk set of extraordinary Japanese clip art. Consists of MacPaint documents and separate fonts. Volume I, Heaven, covers mythological subjects; Volume II, Earth, has secular subject matter. $79.95 each volume; $149.95 each set. Qualitas Trading, 6907 Norfolk Road, Berkeley, CA 94705. NCP (Apr '87)

LaserFonts are new fonts for the LaserWriter. Users download them to their machines. Very high quality and very simple to use. Willamette looks like Avant Garde. MicroFonts provides tiny, expanded, and condensed versions of the LaserWriter's own fonts. $34.95 to $44.95 each. Century Software, 2483 Hearst, #175, Berkeley, CA 94709. NCP

LaserPaint's clumsy interface makes it a slow program. There's good laser output if you persevere through the creation of a document. The support is scads better than the documentation. Version 1.1.4. $495. LaserWare, P.O. Box 668, San Rafael, CA 94915. CP (Jan '88)

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MINIFINDERS



Lasertalk is a PostScript programming tool that establishes interactive contact with laser printers. Preview window and on-line help make it a powerful tool. Requires 1 megabyte + and a PostScript Printer. $249. Emerald City Software, P.O. Box 2103, Menlo Park, CA 94026. CP until registered (May '88)
★★★★★

Mac Art Dept. is a collection of over 150 graphic images ranging from foods to hands holding signs to borders. Best suited for letterheads, memos, other business use. $39.95. Simon & Schuster, Computer Software Div., 1 Gulf + Western Plaza, New York, NY 10023. NCP (Mar '86)
★★★★

MacCalligraphy simulates brush painting. User-designed Seals and Touches enable you to design your own signature tool and the style of brush you use. Takes some getting used to. $175. Qualitas Trading, 6907 Norfolk Road, Berkeley, CA 94705. NCP (Feb '88)
★★★½

MacDraft is an object-oriented graphics program. It sports advanced features such as variable scaling, single-degree rotation, complex arcs, auto dimensioning, and variable zoom/reduction. $269. Innovative Data Design, 2280 Bates Ave., Concord, CA 94520. NCP (Feb '86)
★★★★

MacDraw is an object-oriented graphics program. Can be used to design forms, create presentation materials, and do technical illustrations. Drawing sizes up to 8 feet by 10 feet are possible. Lacks free notation or zoom-in capabilities. $195. Claris, 440 Clyde Ave., Mountain View, CA 94043. NCP (Nov '85) ★'85 Eddy
★★★★

MacDraw II updates the venerable object-oriented draw program. Adds dithered and color patterns in its own documents, but doesn't support color in the PICT II format. Version 1.0. Requires 1 megabyte, and two 800K disk drives or hard disk. $395. Claris, 440 Clyde Ave., Mountain View, CA 94043. NCP (Nov '88)
★★★½

MacGraphics is an overwhelming collection of bit-mapped clip art—13 thematic disks containing 10 megabytes of art. Unfortunately, most pictures are full-page, and reproduction quality suffers when they are reduced. Version 3.0 reviewed. $225. GoldMind Publishing, 12155 Magnolia Avenue, Suite 3-B, Riverside, CA 92503. NCP (Jan '89)
★★★

MacPaint hasn't lost its shine after all these years. Version 2.0 supports multiple windows, design templates, and a magic eraser for corrections. It lacks free rotation or distortion talents. Requires 512K and second disk drive. $125. Claris, 440 Clyde Ave., Mountain View, CA 94043. NCP (July '88) ★'85,'87 Eddy
★★★½

Mac3D is a feature-laden 3-D program with a MacDraw-like interface. PostScript-resolution shading with six variable light sources, user-definable tools, and many more features. Clumsy interface to rotate objects and camera. Version 2.0. $249. Challenger Software, 18350 Kedzie Ave., Homewood, IL 60430. NCP (Jan '87)
★★★½

MapMaker is a digital cartographer that charts demographic and marketing information on a geographic basis. Wide variety of maps available, some at an additional cost. Version 3.0. Requires 512K. $349. Select Micro Systems, 40 Triangle Center, Yorktown Heights, NY 10598. NCP (Dec '88)
★★★★½

MGMS: Professional CAD for Macintosh offers more than 200 functions. Very complete, capable program. Groups, Dimension, Libraries, etc., are standard. Sometimes confusing — designed for experienced, professional CAD user, not the novice. Full plotter support. 512K+. $799. Micro CAD/CAM, 3230 Overland Ave., Los Angeles, CA 90034. NCP (Nov '87) ★'87 Eddy
★★★★

MiniCad is a pro-level CAD package. Vast array of features, many accessible only through Command/Shift/Option key combinations. Works in 2-D or 3-D with easy transition from one to the other. MacDraw-like interface makes it easy to learn and use. Version 3.0. Requires 512K+. Diehl Graphsoft, 8370 Court Ave., Suite 202, Ellicott City, MD 21043. CP (Oct '87)
★★★★

Modern Artist 2.0 is still an interesting color paint program and has added a few new features, but there's not enough here to justify the substantial price increase. Requires Macintosh II. $495. Computer Friends, 14250 N.W. Science Park Drive, Portland, OR 97229. NCP (Feb '89)
★★½

PictureBase is a powerful graphic librarian. You can store paint and PICT formatted items and attach keywords for later search and retrieval. $69.95. Symmetry, 761 E. University Drive, Mesa, AZ 85203. NCP (Sept '87) ★'86 Eddy
★★★★½

Pixel Paint is a color paint program with customizable palettes and a lot of special effects. Slow Open and Save. Requires Mac II, 2 megabytes, and 8-bit video card. $495. SuperMac Software, 295 N. Bernardo Ave., Mountain View, CA 94043. NCP (May '88)
★★★★½

Post Art I is a collection of signed originals on disk. Overall, a pretty useless collection in terms of clip art. Meant for hanging prints on a wall. Requires a program that reads Encapsulated PostScript Format (EPSF) files. $69.95. Olduvai, 7520 Red Road, S. Miami, FL 33143. NCP (Aug '88)
★

PowerPoint is an easy-to-use desktop presentation tool. Good color schemes. Can send presentations to Genigraphics to produce color 35mm slides. Version 2.0. Requires System 4.1 or later, 1 megabyte and two 800K drives or hard disk. $395. Microsoft, 16011 N.E. 36th Way, P.O. Box 97017, Redmond, WA 98073-9717. NCP (Aug '87)
★★★★

The Print Shop makes it easy to create greeting cards, signs, banners, and letterhead. Uses its own special graphics and can import Paint files. Hard-disk users get version 1.02 or later. $79.95. Broderbund, 17 Paul Drive, San Rafael, CA 94903. CP (Sept '87)
★★★½

Space Edit is a 3-D CAD program. Display shows top, front, side, and axonometric views of an object, all at once or one at a time. Has standard CAD features plus zoom, exploded view, animated flyover. Suppression of hidden lines is very slow. Requires 1 megabyte +. $625. Abvent, 9903 Santa Monica Blvd., Beverly Hills, CA 90212. CP (July '87)
★★★½

StandOut! is a presentation program built like a publishing program, with strong text and graphics support. Automatic text flow around graphics objects. Lacks good graphic examples. Version 1.0. Requires 1 megabyte and two 800K drives or hard disk. $395. Letraset, 40 Eisenhower Drive, Paramus, NJ 07652. NCP (Nov '88)
★★★★

Studio/8 is a professional-level color paint application for the Mac II. Superior tool set, elegant interface, excellent performance, and speed. Version 1.0. Requires Mac II and hard disk; 2 megabytes of RAM recommended. $495. Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. NCP (Jan '89)
★★★★★

SuperPaint is a powerful, easy-to-use graphics program with all the best features of MacPaint and MacDraw — and then some. LaserBits provides 300 dpi magnification and there are 40 editable brush shapes. Requires 512K+. $149.95. Silicon Beach Software, 9580 Black Mountain Road, P.O. Box 261430, San Diego, CA 92126. NCP (Feb '87) ★'87 Eddy
★★★★½

Super 3D is a high-power 3-D modeling program with an excellent integrated interface. Powerful time-saver. Features include animation, import/export of 3-D worlds as text files. Excellent for art, design, or technical work. Version 1.0. Requires 1 megabyte. $295. Silicon Beach Software, 9580 Black Mountain Road, P.O. Box 261430, San Diego, CA 92126. NCP (Jan '88).
★★★★★

Trapeze is a powerful presentation worksheet that combines mathematical functions and graphic representation. The interface, which consists of an icon bar, can be awkward to use. Mac II and color supported. Version 2.0. $395. Access Technology, 555C Heritage Harbor, Monterey, CA 93940. NCP (Dec '87)
★★★★½

TrueForm takes a scanned image of a paper form and turns it into an electronic equivalent, complete with fields for entering data. It can automatically sum numeric fields. Requires external 800K drive. $495; run-time version, $295. Spectrum Digital Systems, 2702 International Lane, Madison, WI 53704-3122. NCP (May '88)
★★★★½

VersaCAD is a powerful CAD program that doesn't show any of its MS-DOS roots. Excellent element manipulation, full plotter support. Library user interface is crude. Requires 1 megabyte +. $1,995. VersaCad, 2124 Main St., Huntington Beach, CA 92648. NCP (July '88)
★★★★

VideoWorks II is an easy-to-use animation tool — the best available on the Mac. Has an Overview mode that acts as a slide show carousel for presentations. Works in color on the Mac II. $195. Requires 1 megabyte + and an 800K drive. MacroMind, 1028 W. Wolfram, Chicago, IL 60657. NCP (Mar '88) ★'85, '87 Eddy
★★★★½

VideoWorks II Accelerator compiles VideoWorks II movies to make them run more smoothly. Compensates for the QuickDraw screen display. Version 1.0. Requires 1 megabyte, VideoWorks II; hard-disk drive recommended. $195. MacroMind, 1028 West Wolfram, Chicago, IL 60657. NCP (Dec '88)
★★★★

VideoWorks II Clip Animation, Clip Charts, Black and White Movies, and Clip Sounds are four separate aids to help you construct movies and business presentations. Requires VideoWorks II. $49.95 to $59.95. MacroMind, 1028 W. Wolfram, Chicago, IL 60657. NCP (Aug '88)
★★★★

WetPaint consists of two three-disk volumes of very high quality clip art. Also includes the Art Roundup DA, a good art browser/editor. Volume 1 or 2, $39 each; both volumes, $59. Available in PictureBase format for $15 extra per volume. Dubl-Click Software, 18201 Gresham St., Northridge, CA 91325. NCP (Sept '87)
★★★★★

World-Class Fonts! comes in two volumes of three disks each. Includes all the Mac the Knife fonts and a lot more, including two useful utilities. This is now the best collection of ImageWriter fonts available. Each volume: $39; both volumes: $59. Dubl-Click Software, 18201 Gresham St., Northridge, CA 91325. NCP (Dec '86)
★★★★½

DESKTOP PUBLISHING

Interleaf Publisher is a speedy multiuser layout system for producing large, complicated documents. Has strong global formatting ability but can't use downloadable fonts. Requires Mac II with 5 megabytes of RAM and 40-megabyte hard disk, $2,495. Interleaf, 10 Canal Park, Cambridge, MA 02141. NCP (May '88)
★★★½

JustText is a professional-level word processor and page makeup program that generates PostScript output. Comes with a set of LaserWriter utilities that allow total manipulation of art and text. Requires LaserWriter or other PostScript compatible output device. $195. Knowledge Engineering, G.P.O. Box 2139, New York, NY 10116. NCP (Dec '85)
★★★½

MINIFINDERS

MacTEX is the TeX environment of choice for hardcore TeX users on the Macintosh. Very intimidating for others. Painfully slow and visually unattractive. Version 2.0. Requires 1 megabyte +. $750. FTL Systems, 234 Eglington Ave. East, Toronto, Ontario M4P 1K5, Canada. NCP (Apr '88)

PageMaker retains its paste-up approach to page layout. New features include auto text flow, style sheets, and spot color support. The standard keeps getting better. Version 3.0. Requires 1 megabyte +, and a hard disk. $595. Aldus, 411 First Ave. South, Seattle, WA 98104. NCP (Aug '88) ★ '85, '87 Eddy.

Portfolio: Designs for Newsletters provides more than 20 templates for two-page newsletters with preset columns, headlines, graphics, and captions. Documentation provides excellent tutorial in page design. Requires 512K+; PageMaker. $79.95. Aldus, 411 First Ave. S., Suite 200, Seattle, WA 98104. NCP (May '87)

Publishing Packs bundle together three Adobe typefaces that work well for a particular publishing project. The packages offer substantial savings over purchasing the typefaces individually, and the documentation has useful information on typeface characteristics. Newsletters, $395; Forms & Schedules, $475; Presentations, $475. Adobe Systems Inc., 1585 Charleston Road, Box 7900, Mountain View, CA 94039. NCP (Feb '89)

QuarkStyle is a collection of 72 designer-created templates for "instant" desktop publishing. The templates, which cover the gamut from business cards to newsletters, let you concentrate on a page's contents rather than its appearance. Version 1.0. Requires 1 megabyte and hard disk. $295. Quark, 1983 Landings Drive, Mountain View, CA 94043. NCP (Feb '89)

QuarkXPress is a powerful page-layout program, with 24-bit color, style sheets, and search and replace of text attributes. Also does four-color separations. Layout is done using text and picture boxes, which improves control but is difficult to master. Version 2.0. Requires more than 1 megabyte as well as a hard disk. $795. Quark, 1983 Landings Drive, Mountain View, CA 94043. CP until registered. (Jan '89)

Ragtime is an "Integrated Page Processor" with text, graphics, and built-in spreadsheet. Flow text automatically from one frame to another. Spreadsheet has a full set of functions. Excellent, easy-to-use program. Requires 512K+. $395. Orange Micro, 1400 N. Lakeview, Anaheim, CA 92807. NCP (Aug '88)

Ready,Set,Go! 4 has an elegant interface and excellent manual. Powerful text wraparounds, fast word processor with hyphenation and spelling check and custom stylesheets. Requires 1 megabyte +. $495. Letraset, 40 Eisenhower Drive, Paramus, NJ 07652. NCP (Feb '88) ★'86 Eddy

TeXtures is an implementation of TeX, the big daddy of typesetting programs. Good for people trained on mainframes in the early days. Otherwise very sticky with a high learning curve. Version 1.0. Requires 512K+. $495. Blue Sky Research, 534 S.W. Third Ave., Portland, OR 97204. NCP (Apr '88)

COMMUNICATIONS

AppleShare is the file sharer marketed by Apple. Software-based, AppleShare requires you to dedicate a Mac and a hard disk to run it. Allows users on the network to protect things from other users on the folder level. Interface to network is provided at a revised Finder. $799. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. NCP (May '87)

ComServe allows you to share a Hayes-compatible modem over an AppleTalk network. You can call out, but you can't call in. Works with most telecommunications packages. $195 per server. Infosphere, 4730 S.W. Macadam Ave., Portland, OR 97201. CP (Feb '88)

Desktop Express is a simple-to-use, semi-automated program for using MCI Mail and Dow Jones News/Retrieval. Performance is traded off for ease of use. Requires 512K+. $149. Dow Jones, P.O. Box 300, Princeton, NJ 08543. NCP (Jan '88)

InBox is an easy-to-use mail system. It's called up from a desk accessory. Has a very slick interface. Dedicated Mac not required. $350 for starter set, which includes one Administrator disk and three Connection disks. Additional Connections cost $125 each. Tops, 950 Marina Village Parkway, Alameda, CA 94501. NCP (May '87) ★'86 Eddy

InTalk comes with its own communications command language able to do unattended sessions. Supports Xmodem and MacBinary. Has a macro key function. Many sample setup documents and command language files provided. $195. Palantir, 12777 Jones Road, Houston, TX 77070. NCP (Prem)

LapLink Mac quickly transfers data to and from the MS-DOS and Mac environments. Kit contains a cable and software. Control of transfer is on the IBM side. Version 1.2. Requires 512K. $139.95. Traveling Software, 19310 North Creek Parkway, Bothell, WA 98011. NCP (Aug '88)

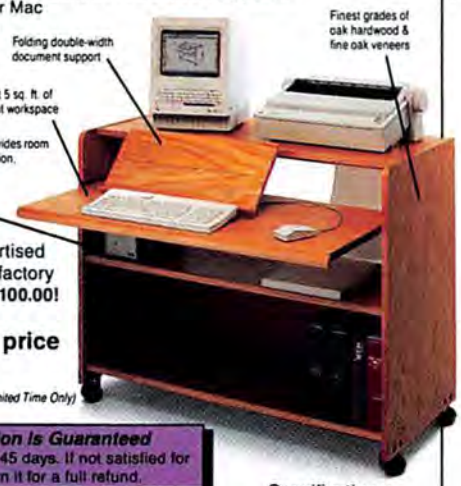
MacTerminal provides basic telecommunications and terminal emulation. Doesn't have macros nor any sort of auto redial/auto log-on capability. Best for those needing faithful VT100 or IBM 3278 emulation — it is superb at those. $125. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. NCP (Prem)

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MINIFINDERS



MacWorkStation is a development environment and communications program
★★★★ that accesses custom mainframe applications through the Macintosh interface. Modular design allows for expandability. Mac II and MultiFinder friendly. Version 3.0. $2,500 for internal use license, $5,000 for commercial use license. Apple Software Licensing, 20525 Mariani Avenue, Cupertino, CA 95014. NCP (Oct '88)

MicroPhone is a high-powered terminal program that's easy enough for novices.
★★★★½ Very powerful command language allows full automation of communications, if desired. $295. Software Ventures, 2907 Claremont Ave., Berkeley, CA 94705. NCP (July '86) ★'86 Eddy

Microsoft Mail is an electronic mail system that runs under AppleTalk. Supports
★★★★½ file transfers across the mail system. Full on-line help facility. Also includes "While you were out" messages. Desk accessory based. Prices determined by number of users licensed. One to four users, $299.95; five to 10 users, $499.95; 11 to 20 users, $749.95; 21 or more users, $949.95. Microsoft, 16011 N.E. 36th Way, Redmond, WA 98073-9717. NCP (May '87) ★'87 Eddy

PC MacTerm/pcAnywhere III are two programs that work together to take control
★★★★ of an MS-DOS machine from the Mac keyboard. Versions: PC MacTerm 1.1; pcAnywhere III 3.0. Requires 512K; System 4.1 or later; 128K IBM PC compatible and MS-DOS 2.1 or later. PC MacTerm, $99; pcAnywhere III, $145. Dynamic Microprocessor Associates, Inc., 60 East 42nd St., New York, NY 10165. NCP (Jan '89)

Red Ryder is a full-featured telecommunications program that supports MacBin-
★★★★★ ary, Xmodem, and Kermit. Has big screen-support, auto procedure creator, and up to 30 keyboard macros. This is the cream of the crop (in late '87). $80. Freesoft, 150 Hickory Drive, Beaver Falls, PA 15010. NCP (Dec '87) ★'87 Eddy

Smartcom II balances power and ease of use. Capable of unattended operation
★★★★½ and has a very powerful command language. Supports MacBinary, Xmodem, and Hayes Verification protocols. The large-screen buffer can easily be archived. $149. Hayes, 5923 Peachtree Industrial Blvd., Norcross, GA 30092. NCP (July '86) ★'85 Eddy

TOPS is a file server designed to network computers with different operating
★★★★½ systems. Supports Macs, MS-DOS compatibles, and UNIX. Access to files and subdirectories is transparent to the user; they appear as Mac folders. Only handles ASCII or Text files. $249 for Mac version. TOPS, 950 Marina Village Parkway, Alameda, CA 94501. Serial number protected. (May '87) ★'87 Eddy

VersaTerm-Pro is a very powerful terminal program with several special features.
★★★★½ Does one of the best VT100 emulations available and specializes in high-quality Tektronix 4014 and 4105 emulation. A pro's tool. Requires 512K+. $295. Peripherals, Computers & Supplies, 2457 Perkiomen Ave., Mount Penn, PA 19606. NCP (Apr '87)

WORD PROCESSORS

ArchiText is a text processor with many hypertext capabilities, as well as the
★★★★ ability to include graphics. "Nodes" of text are accessed by means of different "maps." Very powerful. Version 1.0 reviewed. Requires 1 megabyte. $349.95. Brainpower, 24009 Ventura Blvd., Suite 250, Calabasas, CA 91302. NCP (Feb '89)

Document Compare allows users to compare any two MacWrite 4.5, ASCII, or
★★★ MDS documents. Differences in spelling, punctuation, formatting, and wording are detected. Documents can be printed out with differences highlighted. $99. Legalware, 33 Young St., Toronto, Ontario M5E 1S9, Canada. NCP (May '86)

Document Modeler can automate much of a professional office's correspon-
★★★★½ dence. Comes in two parts: Template Maker and Document Maker. Initial setup requires time and is complex. $299.95. Legalware, 33 Young St., Toronto, Ontario M5E 1S9, Canada. NCP (Mar '87)

Doug Clapp's Word Tools is a useful punctuation and style-editing program. It
★★★★ won't turn you into a Proust, but it will help you make your writing cleaner and clearer. Word counts among different formats show discrepancies, but not to worry. Requires 512K+. $79.95 Aegis Development, 2125 Pico Blvd., Santa Monica, CA 90405. NCP (Sept '87)

Expressionist is a powerful DA that allows you to create complex mathematical
★★★★★ equations from within an application. Equation manipulation has never been easier. $79.95. Allan Bonadio Associates, 1579 Dolores St., San Francisco, CA 94110. NCP (July '87)

FullWrite Professional combines outlining and word processing with page
★★★★ layout and drawing. Its many features translate into sluggish performance unless you have a lot of extra RAM. Impressive. Version 1.0. Requires 1 megabyte. Mac II and MultiFinder friendly. $395. Ashton-Tate, 20101 Hamilton Ave., Torrance, CA 90502. NCP (Sept '88)

Graham Speller is a desk accessory-based spelling checker. Includes macro
★★★ feature. Good guesser in interactive mode. Clumsy interface. Version 1.1. $44.95. Graham Software, 8609 Ingalls Circle, Arvada, CO 80003. NCP (Sept '88)

Kadmos Greek Font is a full character set of ancient Greek that prints on any
★★★½ PostScript printer. Requires learning new typing skills, but excellent quality makes it worth the effort. $85. Allotype Typographics, 1600 Packard Road, Ann Arbor, MI 48104. NCP (Oct '87)

Laser Author is a high-powered, technically oriented word processor. Good math-
★★★½ setting capability. Has style sheets, word count, and page layout capability. $199.95. Firebird Licensees, P.O. Box 49, Ramsey, NJ 07446. NCP (Mar '87)

Liberty Spell Checker is a fast, effective, interactive checker. The dictionary is
★★★½ smaller than average, but well chosen. Unfortunately, it has a few misspelled words. $59.95. DataPak, 14011 Ventura Blvd., Sherman Oaks, CA 91423. CP (Oct '86)

Lookup is an on-call, quick, single-word spelling checker. Designed for the way
★★★★★ writers really work. Uses the 93,000+ word Spellswell dictionary. $49.95. Working Software, 321 Alvarado, Suite H, Monterey, CA 93940. (Dec '87) NCP

MacGAS is a DA spelling checker with both a small and extended dictionary. Its
★★★ best point is the excellent thesaurus. Provides antonyms and glossary. A slow checker. $99. EnterSet, 2380 Ellsworth, Berkeley, CA 94720. CP (Oct '86)

MacProof is a grammar, style, and spelling checker that's like having your own
★★★★½ personal copy editor. Grammar rules are fixed, and you may not agree with the choices. The program only suggests corrections, it doesn't make them for you. And the checking process can be slow if your document is long. $195 for stand-alone version; $2,500 for networked version. Automated Language Processing Systems, 190 W. 800 North, Provo, UT 84604. NCP (Apr '87)

Macspell+ is a spelling checker that installs as a desk accessory. Works easily
★★★★ with MacWrite 4.5 and 2.2 and Word, but has some drawbacks. New version 1.10 just available. Requires 512K+, two drives or hard disk. $99. Creighton Development, 16 Hughes St., Irvine, CA 92718. NCP

MacWrite is starting to show its age. While still a good, basic program, it's out-
★★★ performed by its competition. Probably enough for the occasional user. Version 5.0 includes command key equivalents and spelling checker. Requires 512KE+. $125. Claris, 440 Clyde Ave., Mountain View, CA 94043. NCP (June '88) ★'85 Eddy

MergeWrite is a mail-merge program for MacWrite (also works with ASCII files).
★★★½ Program combines names and addresses from a data file into predefined fields in a form letter. Also allows simple conditional IF-THEN-ELSE equations. $49.95. Software Discoveries, 137 Krawski Drive, South Windsor, CT 06074. NCP (Dec '87)

MindWrite integrates outlining and word processing better than anyone. Version
★★★★ 1.1 fixes many problems of the earlier version. Sophisticated search and select options. Unimpressive speed. $295. Access Technology, 555C Heritage Harbor, Monterey, CA 93940. NCP (Feb '88)

QUED/M is an excellent text editor that saves documents in a form readable by
★★★★½ most computers and printers. Doesn't support graphics or multiple fonts. Programming language allows creation of database. Version 2.01. $129. Paragon Concepts, 4954 Sun Valley Road, Del Mar, CA 92014. NCP (Mar '88)

Scriptor is designed for producing standard-format scripts. Starts with a Word
★★★½ document. As you change your Word document, Scriptor will reformat, renumber, and reprint the script. Supports LaserWriter and daisywheel printers. $295. Screenplay Systems, 348 E. Olive Ave., Suite F, Burbank, CA 91502. NCP (May '87)

Sensible Grammar corrects some of the more glaring errors that writers make.
★★★ Also analyzes the word count and structure of sentences to come up with a readability rating. Slow. Version 1.1d. Requires 512K. $99.95. Sensible Software, 335 E. Big Beaver, Suite 207, Troy, MI 48083. NCP (Dec '88)

Spelling Champion is a fast and accurate batch-type spelling checker. Back-up
★★★★ feature allows you to undo corrections in a paragraph. Works only with MacWrite 4.5. $39.95. Champion Software, 6617 Gettysburg Drive, Madison, WI 53705. NCP (Oct '86)

Spelling Coach Professional is a desk accessory and stand-alone spelling check-
★★★★½ er as well as thesaurus. Includes dictionary definitions. Off-the-wall phonetic guesses. Version 3.0. $195. Deneba Software, 7855 N.W. 12th Street, Suite 202, Miami, FL, 33126. NCP (Sept '88)

Spellswell is a stand-alone batch spelling checker. Also checks for punctuation
★★★★½ and other errors. Good dictionary, thorough checking, simple interface. Weak guessing. Version 2.0. $74.95. Working Software, P.O. Box 1844, Santa Cruz, CA 95061. NCP (Sept '88) ★'86 Eddy

Thunder! is a desk accessory spelling checker. Includes macro features. Fairly
★★★★½ fast, good guessing of misspelled words. Small dictionary. MultiFinder hostile. Version 1.1. $49.95. Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. NCP (Sept '88)

Word Finder is an electronic thesaurus that won't replace your trusty Roget's,
★★★½ but is still useful for checking synonyms on the fly. Large, respectively. Version 2.0. Requires 512K. Mac II and MultiFinder friendly. $59.95. Microlytics, 300 Main St., Rochester, NY 14445. NCP (Sept '88)

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MINIFINDERS

Word 3.02 is the most feature-laden word processor around. Also has Microsoft's ‡‡‡‡½ somewhat unusual view of what the Mac interface is. Esoteric command key combinations. Requires 512K+. $395. Microsoft, 16011 N.E. 36th Way, Redmond, WA 98073. NCP (Mar '88)

WordPerfect is a good choice for offices needing compatibility, but not so hot ‡‡‡½ otherwise. Good internal file-management system and macro maker. Uses hidden formatting codes, hierarchical menu system. Requires Mac 512KE, System 4.1 or later. Two 800K disk drives or a hard disk recommended. Not fully compatible with System 6.0. $395. WordPerfect, 1555 N. Technology Way, Orem, UT 84057. NCP (Feb '89)

WorksPlus Spell is a speedy spelling and hyphenation checker for Microsoft ‡‡‡‡½ Works. It includes a glossary for abbreviations and time/date stamping. The biggest drawback is its limitation to one program. $59.95. Lundeen & Associates. P.O. Box 30038, Oakland, CA 94604. NCP (Oct '87) ★'87 Eddy

Write is a "beginner's" version of Word 3.0. More features than some word ‡‡‡ processors in its class, but not all of the features work well. Poor value, and expensive upgrade path to Word. $175. Requires 512K+. Microsoft, 16011 N.E. 36th Way, P.O. Box 97017, Redmond, WA 98073-9717. NCP (May '88)

WriteNow for the Macintosh has many of the features of MacWrite and then ‡‡‡‡½ some, including the ability to work in columns. Has built-in spelling checker with 50,000-word dictionary. $175. T/Maker, 1973 Landings Drive, Mountain View, CA 94043. NCP (Mar '87)

SYSTEM SOFTWARE

HyperCard is a totally unique program for the Mac. It uses an index-card metaphor ‡‡‡‡ and it contains a programming language, HyperTalk. Requires 1 megabyte +. Free with new Macs and bundled with many HyperCard stacks, otherwise $49.95. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. NCP (Dec '87) ★'87 Eddy

SoftPC puts an IBM PC/XT inside your Mac without cracking the case to add any ‡‡‡½ special coprocessor boards. The emulation of an MS-DOS machine is done entirely in the software. Version 1.2. Requires Mac II or SE equipped with 68020 accelerator card; 2 megabytes of RAM. $595. Insignia Solutions, 1255 Post St., Suite 625, San Francisco, CA 94109. NCP (Nov '88)

System Tools 5.0 is the Apple System upgrade for Mac Plus, SE, and II owners. It ‡‡‡‡ contains MultiFinder (a multitasking environment), a LaserWriter spooler, and a Control Panel resource to add color on the Mac II desktop. Requires 1 megabyte +. $49. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. NCP (Mar '88)

System Tools 6.0 contains an improved version of MultiFinder and new features ‡‡½ like CloseView (for visually impaired users), Map, and MacroMaker. Incompatible with many programs; lots of small bugs. Requires 1 megabyte. $49. Apple Computer, 20525 Mariani Avenue, Cupertino, CA 95014. NCP (Nov '88)

HYPERCARD

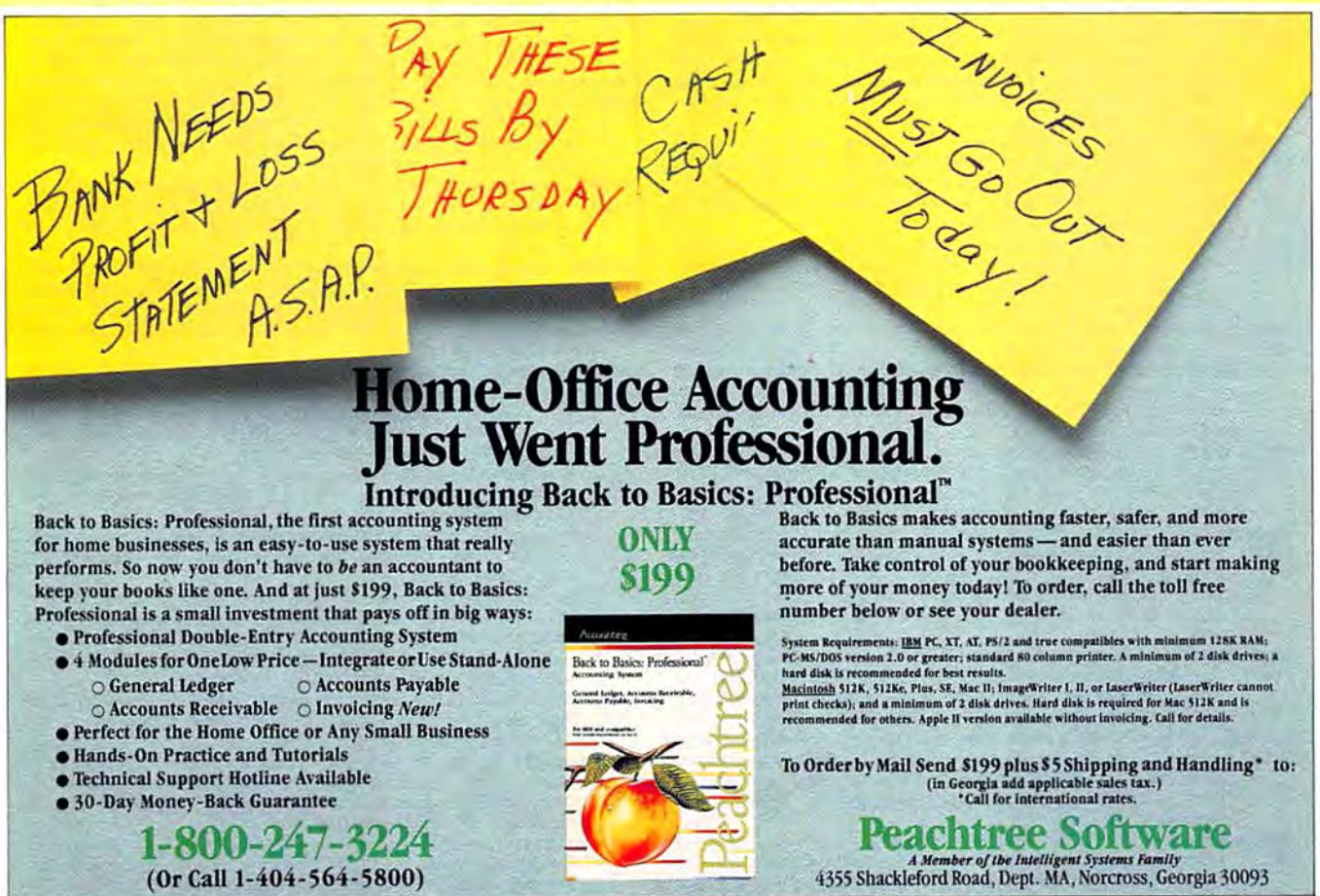
Business Class is a HyperCard stack that contains world travel information and ‡‡‡½ itinerary planning. Uses maps to locate countries of interest, but it lacks United States domestic travel information. Requires 1 megabyte + and HyperCard. $49.95. Activision, 3885 Bohannon Drive, Menlo Park, CA 94025. NCP (Mar '88)

City to City imparts travel information on 31 U.S. cities including details on hotels, ‡‡‡‡ restaurants, and nightlife. Helps plan an itinerary. Requires HyperCard, two disk drives, and a printer. $49.95. Activision, 3885 Bohannon Drive, Menlo Park, CA 94025. NCP (Sept '88)

Focal Point is a HyperCard stack that ties together a calendar, phone log, client ‡‡‡‡½ accounts, and more in one easy-to-use organizational tool. Requires 1 megabyte + and HyperCard. $99.95. Activision, 3885 Bohannon Drive, Menlo Park, CA 94025. NCP (Mar '88)

HyperAtlas is a collection of U.S. and World maps that are networked to stacks ‡‡‡ containing economic, political, and population data. Version 1.0. Requires HyperCard and second disk drive or hard disk. $99. MicroMaps Software, P.O. Box 757, Lambertville, NJ 08530. NCP (Oct '88)

HyperDA lets you browse through HyperCard stacks through a desk accesso- ‡‡‡‡ ry. A true equalizer for 512K Mac owners who cannot normally access stackware. Doesn't support global variables. Requires 512K+. $69.



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MINIFINDERS



Symmetry, 761 E. University Drive, Mesa, AZ 85203. NCP (May '88)

HyperTutor is a stack that teaches HyperTalk, Hypercard's programming lan- ★★★★½ guage. Uses an interactive Test Mac on each card to write scripts. A variety of windows makes it good for both beginners and advanced programmers. $49.95. Channelmark, 2929 Campus Drive, San Mateo, CA 94403. NCP (Apr '88)

Reports endows HyperCard stacks with the power to sort and impart information ★★★½ like a database. Customizing reports is difficult. Requires HyperCard. $99.95. Activision, Inc., 3885 Bohannon Drive, Menlo Park, CA 94025. NCP (Aug '88)

ScriptExpert helps you generate HyperTalk scripts by leading you through the ★★★★ correct use of the language. Select a common command, and dialog boxes prompt you for necessary components. Version 1.0. Requires HyperCard. $79.95. Hyperpress Publishing, P.O. Box 8243, Foster City, CA 94404. NCP (Oct '88)

VideoWorks II HyperCard Driver lets you play movies directly from a stack. One ★★★½ way to add color animation to HyperCard. Version 1.0. Requires 1 megabyte, VideoWorks II, and HyperCard; hard-disk drive recommended. $99.95. MacroMind, 1028 West Wolfram, Chicago, IL 60657. NCP (Dec '88)

ORGANIZATIONAL TOOLS

Acta is an outline processor in desk accessory format. It has practically all the ★★★★½ power of a stand-alone program, and then some. Can save files as Acta outlines, MacWrite files, or text files. Version 2.0. $79. Symmetry Corporation, 761 E. University Drive, Mesa, AZ 85203. NCP (Oct '88)

Comment is an electronic version of Post-it Notes. A mini-word processor lets you ★★★★ attach notes to a spreadsheet cell, to words in a text document, or to a window on the desktop. Version 2.0. Requires 512KE. $99.95. Deneba Software, 3305 N.W. 74th Ave., Miami, FL 33122. NCP (Dec '88)

Design is a powerful organizational tool. It goes beyond mere flowcharting. Graphi- ★★★★½ cally depicts relationships between systems. Complex, detailed program aimed at software pros. $250. Meta Software, 150 Cambridge Park Drive, Cambridge, MA 02140. NCP (Apr '88)

FamilyCare is a "yuppie" handbook to childhood diseases. The rule-based expert ★★★ system gives advice based on symptoms. Ailments and diseases run the gamut from acne and appendicits to wheezing and yeast infections. Lacks graphics. Version 1.0. Requires 512K. $99. Lundin Laboratories, 29451 Greenfield Road, Southfield, MI 48076. Mac II and MultiFinder friendly. NCP (Sept '88)

FlowMaster charts your ad dollars in print, TV, billboard, and other mediums. ★★★★★ Analyzes cost/benefit of a campaign in terms that even jaded Mad. Ave. execs will find innovative. Includes bar-chart and tabular output. Requires 512K+. $495. Select Micro Systems, 40 Triangle Center, Yorktown Heights, NY 10598. NCP (Jan '88)

For the Record is a database specifically designed for legal, financial, and person- ★★★★ al records. Allows password locking of screens containing sensitive personal data. Version 1.0 reviewed. Requires 512KE. $49.95. Nolo Press, 950 Parker St., Berkeley, CA 94710. NCP (Feb '89)

FormSet: Business Forms Edition brings a wealth of business forms, such as ★★★ expense reports and profit/loss statements, into the electronic arena. Fields are automatically calculated. Can't be customized beyond adding logo. Version 1.0. Requires 512KE and two 800K floppy drives or hard disks. $95. SoftView, 4820 Adhor Lane, Suite D, Camarillo, CA 93010. NCP (Jan '89)

GeoQuery puts your database on the map by accessing zip code information. ★★★★ Comes with maps of the U.S. Other atlases available. Version 1.0 reviewed. Requires 1 megabyte + and second disk drive. $349. Odesta, 4084 Commercial Avenue, Northbrook, IL 60062. NCP (July '88)

Guide allows you to "cross reference" from within a document using hypertext. ★★★★½ You can set up words or sections of the document so that double-clicking brings up explanatory material, graphics, and other useful items. The word processing and formatting functions, however, are limited. $135. OWL International, 14218 N.E. 21st St., Bellevue, WA 98007. NCP (Apr '87)

Inspiration's flowcharting tools let you free-associate ideas visually, then auto- ★★★ matically dump the flowchart into a text outline. Version 1.0. Requires 512KE and an 800K drive or a hard-disk drive. $149. Ceres Software, 9498 S.W. Barbur Blvd., Suite 103, Portland, OR 97219. NCP (Dec '88)

Instant Expert is an excellent way to learn the mechanics of creating an expert ★★★½ system. The inference engine (that ultimately finds the answer) is visible. Lacks a true Mac interface. Version 1.0. $49.95. Human Intellect Systems, 1670 S. Amphlett Blvd., Suite 326, San Mateo, CA 94402. NCP (Jan '88)

MacProject allows a user to plan and track a project from beginning to end. Uses ★★★ CPM to produce schedules with start and finish dates for each task. Can report on resource interdependencies and generate all needed printed reports. $195. Claris, 440 Clyde Ave., Mountain View, CA 94043. NCP (Mar '86)

MacSMARTS can create small, stand-alone expert systems. Features hypertext ★★★ connections to Paint, PICT, SYLK, and text files. Still a little buggy. Version 1.03. Requires 512K+. $149.95. Cognition Technology, 55 Wheeler St., Cambridge, MA 02138. NCP (Jan '88)

Microsoft Works is an integrated application that includes word processing, ★★★★½ database, spreadsheet, and telecommunications functions. The telecommunications module includes both background up- and downloading. $295. Microsoft, 16011 N.E. 36th Way, Redmond, WA 98073-9717. NCP (Oct '86) ★'86 Eddy

MORE is an incredibly powerful outline processor with gobs of great features: ★★★★★ instant charts, math capabilities, multiple windows, font and style control, templates, and more. Prints outlines in any of several standard formats, even in color. Requires 512K+. $395. Symantec, 117 Easy St., Mountain View, CA 94043. NCP (Jan '87) ★'86 Eddy

QuickDex keeps your phone numbers in an electronic Rolodex. The desk accesso- ★★★★½ ry even plays the tone through the Mac's sound port. Version 1.4a. Requires 512KE; hard disk is recommended. $60. Casady & Greene, P.O. Box 223779, Carmel, CA 93922. NCP (Jan '89)

STELLA for Business is a simulation tool used to model complex business sys- ★★★★½ tems. Requires that you master a discipline called "system dynamics." Requires 512K+. Mac II version available. $350. High Performance Systems, 13 Dartmouth College Highway, Lyme, NH 03768. NCP (June '88)

SuperExpert is an expert system shell that induces rules from examples. Rules ★★½ become unwieldy when many criteria and examples are used. Overpriced. Version 1.4 reviewed. Requires 512KE. $199.95. Softsync, 162 Madision Avenue, New York, NY 10016. NCP (July '88)

UTILITIES

AutoMac III is similar to Tempo II and Apple's MacroMaker but is generally easier ★★★½ to use and comes with excellent documentation and a powerful Macro Editor. Version 2.0 reviewed. Requires 512KE. $79.95. Also distributed with Microsoft products (Word 3.02 and 4.0, File 2.0). Genesis Micro Software, P.O. Box 6236, 17124 N.E. Eighth Place, Bellevue, WA 98008. NCP (Feb '89)

AutoSave DA is insurance against system crashes. It saves your work automati- ★★★ cally at intervals from 1 to 99 minutes. Compatible with many applications, but not recommended for use with databases. $49.95. Magic Software, 1706 Galvin Road S., Bellevue, NE 68005. NCP (Jan '88)

CalendarMaker creates monthly calendars in a variety of formats. Users can ★★★★½ incorporate their art and daily notes. Note files can be imported from a variety of DA calendars and outliners. Shareware and prelicensed versions available. $49.95. CE Software, 1854 Fuller Road, West Des Moines, IA 50265. NCP (Dec '86)

Capture saves any portion of a Macintosh screen to the Clipboard or as a PICT file. ★★★★★ Works in color on the Mac II. Requires 512K+. MultiFinder friendly. $59.95. Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301. NCP (June '88)

Colorizer adds pigments to the desktop and black-and-white applications. Also ★★★ colors PICT graphics. System resources include saving and printing color screens. A useful novelty that'll run its course as developers add color to apps. Requires Mac II. $49.95. Palomar Software, P.O. Box 2635, Vista, CA 92083. NCP (Jan '88)

Copy II Mac does efficient sector and bit copies and in its latest version can back ★★★★★ up virtually all Mac software. Features graphic displays of copy progress. Comes with MacTools, a multi-use utility that can recover many damaged files. $39.95. Central Point Software, 9700 S.W. Capitol Highway, Portland, OR 97219. NCP (Apr '86) ★'85 Eddy

DiskExpress optimizes hard-drive performance by reorganizing fragmented files. ★★★★★ Best of its kind. Version 1.5. Requires 512K. $49.95. ALSoft, P.O. Box 927, Spring, TX 77383. NCP (Jan '89)

DiskFinder searches disks for files as well as cataloging disks. Requires 512KE. ★★½ $49.95. Williams & Macias, South 3707 Godfrey Blvd., Spokane, WA 99204. NCP (Feb '89)

DiskFit is a utility for backing up and restoring hard disk files. Creates a "Smart- ★★★★½ Set" of floppy disks so incremental back-ups only update files modified since the last back-up procedure. Backs up to floppies or another hard disk. Requires 512KE+. $99.95. SuperMac Software, 295 N. Bernardo Ave., Mountain View, CA 94043. NCP (June '87)

DiskQuick is an easy-to-use cataloging program. Criteria selection option for ★★★★ generating subcatalogs. Requires 512K+. $49.95. Ideaforms, P.O. Box 1540, Fairfield, IA 52556. NCP (Apr '87)

Disk Ranger is a speedy cataloging program that doubles as an efficient label- ★★★★ maker. Comes with pinfeed labels. Works with regular and hard disks. Can catalog HFS systems. $34.95. Graham Software, 8609 Ingalls Circle, Arvada, CO 80003. NCP (Mar '86)

DiskTools Plus is a set of eight useful DAs and applications. Earlier version was ★★★★★ sold as Battery Pak. The DA Disk Tools II is a Finder replacement. Also included are an RPN calculator, Phone Pad, and Calendar Manager. Requires 512K+. $49.95. Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. NCP (Mar '88)

MINIFINDERS

DiskTop is a desk accessory Finder replacement of extraordinary power and ease of use. Comes with the useful LaserStatus DA and Widgets application. The extras alone are worth the price. Requires 512K+. Upgrade from version 1.0, $7; $10 with new manual. $49.95. CE Software, 1854 Fuller Road, West Des Moines, IA 50265. NCP (Aug '87)
Dubl-Click Calculator Construction Set lets users design personalized calculators with a variety of standard and special functions. Finished calculators can be saved as installable desk accessories or as clickable applications. $59. Dubl-Click Software, 18201 Gresham St., Northridge, CA 91325. NCP (Apr '86)
Eureka: The Solver is a free-form numerical equation solver. Standard trigonometric and logarithmic functions are available, as is treatment of imaginary and complex numbers. $195. Borland International, 4585 Scotts Valley Drive, Scotts Valley, CA 95066. NCP (Mar '88)
Fastback for the Macintosh is hard disk back-up software that is very quick, if not very efficient. Doesn't automatically exclude applications. Creates a separate catalog disk. $99.95. Fifth Generation Systems, 1322 Bell Ave., Tustin, CA 92680. NCP (Apr '88)
FedIt Plus is the file and disk editor for everyone, from newest Mac owner to oldest. It can do more for your disks and files than any other application. Can recover deleted MFS files. If you own a Mac, get it. HFS-compatible. $49.95. MacMaster Systems, 108 E. Fremont Ave., #37, Sunnyvale, CA 94087. NCP (Sept '86) ★'86 Eddy
Findswell is an indispensible utility that installs a new button in the Open Dialog box of virtually every Macintosh application. Press the button, type a search string, press Find, and Findswell searches for any files that match. Click Open or double-click to open the correct file. Requires 512K+. $49.95. Working Software, P.O. Box 1844, Santa Cruz, CA 95060. NCP (Nov '87) ★'87 Eddy
1stAid Kit HFS recovers lost or damaged files from floppy or hard disks. An excellent manual-turned-textbook actually teaches the Hierarchical File System. Requires 1 megabyte +. Version 2.2 reviewed. $99.95. 1st Aid Software, 42 Radnor Road, Boston, MA 02135. NCP (June '88)
FlashBack is a utility to back up HFS hard disks onto floppies. A unique graphic display of the HFS directory facilitates file selection. The program can handle files larger than 800K. $59.95. Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301. NCP (Nov '86)
Font/DA Juggler Plus gives you unlimited access to almost any number of fonts, desk accessories, and sounds. Uses hierarchical menus. $59.95. ALSoft, P.O. Box 927, Spring, TX 77383. NCP (May '88)
Glue adds a print-to-disk capability to many programs. ImageSaver installs as printer driver; Viewer allows copying and printing of Glue files. Handy utility for desktop publishers. $59.95. Solutions International, P.O. Box 989, Montpelier, VT 05602. NCP (Dec '86)
Hard Disk Util uses patch files to allow users to mount and run specified programs on their hard disks. The list of patches is constantly expanding. $89.95. FWB Software, 2040 Polk St., San Francisco, CA 94109. NCP
HFS Backup ranks as one of the preferred hard disk back-up utilities. Back up by file/folder or last changes. Back-up specifications can be saved as templates. Good graphic interface. Reliable program. $49.95. PCPC, 4710 Eisenhower Blvd., Tampa, FL 33634. NCP (Dec '86)
HFS Locator Plus is *the* essential HFS desk accessory. It can search for a file by name or date of creation, create folders, move files from one folder to another, set a program to launch while in an application. $39.95. PBI Software, 1163 Triton Drive, Foster City, CA 94404. NCP (Sept '86)
Icon-It! lets you create icons to use as an alternative to menu commands. Comes with 47 icon templates or you can create your own. Version 1.0. $79.95. Olduvai Software, 7520 Red Road, South Miami, FL 33143. NCP (Feb '88)
LabView is a graphical programming environment that creates "virtual instruments" to perform calculations, acquire laboratory data, and control instrumentation. Slow. Version 1.1 reviewed. $1900. National Instruments, 12109 Technology Blvd., Austin, TX 78727-6204. NCP (July '88)
LaserServe is a printer spooler for AppleTalk networks. After installation all operations are done via a desk accessory. Works with both MacServe and TOPS. Requires 512K+ and 800K drive or hard disk. $95 per node. Infosphere, 4730 S.W. Macadam Ave., Portland, OR 97201. NCP (Feb '87)
Mac Disk Catalog II is a utility that will quickly organize a moderate-size disk library. Easy to use with powerful reporting and label-making features. $49.95. New Canaan MicroCode, 136 Beech Road, New Canaan, CT 06840. NCP (Dec '85)
MacFlow is a design tool created for programmers. Traditional flowcharting symbols are linked together, and a symbol can be connected to a separate flowchart file. Now supports custom symbols. $125. Mainstay, 5211-B Derry Ave., Agoura Hills, CA 91301. NCP (Apr '87)
MacInUse tracks time spent in applications and saves info as text files. Installs on any disk, works in background. MFS, HFS compatible. Extremely valuable for tax purposes, client records, etc. $79. SoftView, 4820 Adohr Lane, Camarillo, CA 93010. NCP (Jan '87) ★'86 Eddy

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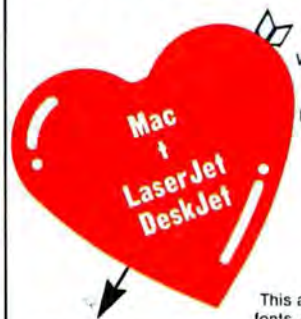
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MINIFINDERS



MacLabeler lets users instantly index and print labels for all the disks in a burgeoning collection. Choose border type and orientation of your label; index by folder or document. Starter set of labels is included. $49.95. Ideaform, P.O. Box 1540, Fairfield, IA 52556. NCP (Prem)

MacNosy is a global disassembler. A very advanced user can use this program to look into the code of virtually any program. This advanced tool can take you places no other Mac program could dream of going IF you have the skill to guide it. The documentation is sparse. For pros only. $170, SE and Plus; $350, Mac II. Jasik Designs, 343 Trenton Way, Menlo Park, CA 94025. NCP

MacSafe is a data file security program that allows you to place multiple files into a "safe," and then you can further protect them through two types of encryption (including DES). Flexible and very easy to use. Allows for installation on hard disk. $149.95. Kent Marsh Ltd., 1200 Post Oak Blvd., Houston, TX 77056. CP (Mar '87)

MacServe converts a Mac and a hard disk into a disk and print server. Uses the AppleTalk network and is easily hooked up. Users can partition the hard disk into multiple volumes. Runs in the background, so users can work on all machines in the network. $250. Requires 512+. Infosphere, 4730 S.W. Macadam, Portland, OR 97201. CP

MacTree displays your files in the form of a hierarchical tree. Good idea, poor performance. Can't view tree easily. Good search function. Requires 512K+. $69.95. Software Research Technology, 22901 Mill Creek Drive, Laguna Hills, CA 92653. NCP (Apr '88)

MacZap is a three-part disk and memory utility. It can be used to recover some damaged files and disks, compare disks, analyze disk structure, and make back-up copies of most disks. $60. Micro Analyst, 2505 Roxmoor, Austin, TX 78723. NCP (Jan '86)

Menu Fonts displays the names of fonts in the actual font instead of standard Chicago. Won't work with programs that have a nonstandard Font menu or no Font menu. Comes with LockOut, a utility that gives password access to your Mac, and FastFormatter, a utility for formatting multiple blank disks. Requires 512K+. $15. Beyond Software, 6069 E. Grant Road, Tucson, AZ 85712. NCP (July '87)

MockPackage+ is a set of extremely powerful DAs. Includes a text editor, text printer (supports LaserWriter), charter, terminal, and EZmenus. HFS compatible. $35. CE Software, 1854 Fuller Road, West Des Moines, IA 50265. NCP (Mar '87)

myDiskLabeler is an excellent label maker. It can read directories and use large or small icons or anything desired. Comes with 54 precut labels. $44.95; with color printing ability (on the ImageWriter II), $54.95; with PostScript font capability (on the LaserWriter), $64.95. Williams and Macias, P.O. Box 19206, Spokane, WA 99219. NCP (Aug '87)

'Ncryptor is a simple, safe program that lets users password-protect their files. The same program is used for encoding and decoding. This is one of the best products in its category. $39.95. Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301. NCP

NightWatch locks up your hard disk by using a floppy start-up disk that acts as a key. Type in the correct password, and access to the hard disk is allowed. Version 1.02. Requires 512KE, a hard disk, and an 800K drive. Mac II and MultiFinder friendly. $149.95. Kent Marsh Ltd., P.O. Box 460289, 1200 Post Oak Blvd., Suite 210, Houston, TX 77056. NCP (Sept '88)

On Cue lets you switch applications without returning to the Finder. Under MultiFinder, active applications are listed on a pop-up menu. Can also launch directly to a specific document. Version 1.0. Requires 512K. Mac II and MultiFinder friendly. $59.95. ICOM Simulations, 648 South Wheeling Road, Wheeling, IL 60090. NCP (Sept '88)

PowerStation is an extremely easy-to-use, versatile and powerful Finder substitute. Loaded with powerful features. Comes with Pyro! $59.95. Fifth Generation, 1322 Bell Ave., Tustin, CA 92680. NCP (Dec '87)

Printworks for the Mac is a comprehensive software-based dot-matrix printer control system. Optimizes printing from different applications, and is easy to use. Requires 512K+. $75. SoftStyle, 7192 Kalanianaole Highway, Honolulu, HI 96825. NCP (Aug '87)

Programmer's On-line Companion puts an abridged version of *Inside Macintosh* in your system for reference. Simply read the text or transfer some or all of it directly into your normal editing window. Non-Mac–ish interface makes the program confusing, somewhat difficult to use. $34.95. Addison-Wesley, Route 128, Reading, MA 01867. NCP (July '87)

Quick & Dirty Utilities, Volume One is a disk full of handy programs. Several desk accessories include a menu bar clock and a terminal emulator. $39.95. Dreams of the Phoenix, P.O. Box 10273, Jacksonville, FL 32247. NCP (Nov '85) ★'85 Eddy

QuicKeys lets you make full use of your keyboard. Assign any command (menu choices, DAs, etc.) or series of text blocks and/or command to any key or key combination. Enormously powerful; necessary for Apple Extended Keyboard owners. Requires 512K+. $99.95. CE Software, 1854 Fuller Road, West Des Moines, IA 50265. NCP (Jan '88) ★'87 Eddy

RamSnap is a RAM disk and disk cache in one easy-to-use package. Can store multiple configurations as files. Good product but a little pricey. $30. Dove Computer Corp., 1200 North 23rd St., Wilmington, NC 28405. NCP (June '87)

Read-It! is the best consumer value in optical character recognition software. Works with any scanner that saves images as a bit map, PICT or TIFF file. Comes with type tables that can be customized. Version 1.1. $395; ThunderScan version, $149.95. Olduvai Software, 7520 Red Road, South Miami, FL 33143. NCP (Apr '88)

Sentinel encrypts data files (or sets of files) using a super-secure DES or a super-fast SuperCrypt algorithm. Provides high-level security if you can keep your passwords secret. Requires 512KE. $295. SuperMac, 295 N. Bernardo Ave., Mountain View, CA 94043. NCP (Apr '88)

Smart Alarms is the best reminder system for the Mac. Easy to use, versatile, and, well, smart. This self-running DA automatically reminds you of anything you enter into its Reminder file, giving you a wide range of useful advance warning options. $49.95. Imagine Software, 19 Bolinas Road, Fairfax, CA 94930. NCP (Oct '86)

SmartScrap and The Clipper are two useful desk accessory utilities for graphics work. SmartScrap is a major enhancement to the standard Scrapbook DA. The Clipper provides you with a transparent Clipboard window, allowing you to resize or crop a graphic to the area that it will be pasted to. $59.95. Solutions International, 30 Commerce St., Williston, VT 05495. NCP (July '87) ★'87 Eddy

SoundWave is a useful sound recording and editing utility. Works with waveforms; able to change sampling rates. Previously known as SoundCap. $199.95. Impulse, 6870 Shingle Creek Parkway, Minneapolis, MN 55430. NCP (Apr '88)

Stepping Out II is a software alternative to a large-screen monitor. Lets you create a virtual screen (as large as memory allows) inside the Mac's 9-inch screen. Automatically scrolls to new document position as you type or draw. Version 2.0. Requires 1 megabyte. $95. Berkeley System Design, 1700 Shattuck Ave., Berkeley, CA 94709. NCP (Oct '88)

StuffIt compresses files to reduce the amount of space they take up on disk. Great for transferring documents via modem. Also joins and encrypts files. Version 1.5. Requires 512KE. Shareware fee, $18. Raymond Lau, 100-04 70 Ave., Forest Hills, NY 11375-5133; also available on most electronic services. NCP (Dec '88)

Suitcase is a transparent program that automatically lets you use all your fonts and DAs. Foolproof and indispensible. Comes with Pyro!, the best screen saver. Requires 512K+. $59.95. Fifth Generation, 1322 Bell Ave., Tustin, CA 92680. NCP (Nov '87) ★'87 Eddy

SuperLaserSpool is a LaserWriter spooler. Very fast because it does conversion to PostScript in the background, but doesn't print a faithful rendition of PageMaker documents as a result. $149.95 single user, $395.95 for up to five users on one network. SuperMac Software, 950 N. Rengstorff Ave., Mountain View, CA 94043. NCP (June '87)

Switcher is Andy Hertzfeld's contribution to Mac productivity. This program lets users run several programs at once (up to eight on a 1-megabyte or larger machine). Switching between the programs is nearly instantaneous. Requires 512K+. $19.95 from Apple, free from BBSs, included with some third-party applications. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. NCP (June '86)

Symantec Utilities for Macintosh (or SUM) reduces worries about losing data. It prevents, diagnoses, and if required, fixes many serious disk and file problems. Recovers lost files on crashed hard disks. Version 1.0. Requires 512KE. $99.95. Symantec, 10201 Torre Ave., Cupertino, CA 95014. NCP (Sept '88)

Tempo II is a powerful keyboard macro program that gives owners of extended keyboards their money's worth. Especially good for building sequential macros. Features include conditional branching and the ability to remember menu selections by name. Version 1.0. $149.95. Affinity Microsystems, Ltd., 1050 Walnut St., Suite 425, Boulder, CO 80302. NCP (Dec '88)

Top Desk is a set of seven self-installing (and self-removing) DAs. Menu Key adds Command key sequences to programs; View allows looking at and moving data between up to eight MacWrite documents; also included are BackPrint, Touch 'n' Go, Blank, Encrypt, and Launch. $59.95. Cortland Computer, P.O. Box 9916, Berkeley, CA 94709. NCP (May '86) ★'86 Eddy

TMON is the debugger for the Mac. This isn't open to question. TMON is simply the best. Comes with the latest version of Darin Adler's Extended User Area. $149. ICOM Simulations, 626 Wheeling Road, Wheeling, IL 60090. NCP

Turbo Download is a desk accessory designed specifically to increase the speed of Xmodem data transfers from national databases to your Mac. Speed increases range upward from 50 percent to over 300 percent at 2400 baud. $39.95. Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301. NCP

Twelve-C Financial Desk Accessory brings all the power and functionality of a Hewlett-Packard 12C programmable calculator to your desktop. Can be programmed and all registers can be viewed while calculator is running. $49.95. Positive Works, 142 Cone Road, Ormond Beach, FL 32074. NCP

MINIFINDERS

TypeNow is a desk accessory that allows the Mac and ImageWriter to function as ¢¢¢¢ an electronic typewriter. Type can be placed into blanks in complex forms easily. Typing can be recorded and played back. $39.95. Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301. NCP (Jan '86)

WorksPlus Command lets you build and define macros for all Works modules. ¢¢¢¢ Predefined macros provide for an even tighter integration of the program's word-processing, spreadsheet, and database modules. Requires 1 megabyte +. $99.95. Lundeen & Associates, P.O. Box 30038, Oakland, CA 940604. NCP (May '88)

LANGUAGES

AAIS Prolog is a fast standard Prolog with excellent debugging and error handling. ¢¢¢¢ Good for serious program development. Documentation is not as good as the program. $150. Advanced AI Systems, P.O. Box 39-0360, Mountain View, CA 94039-0360. NCP (Mar '87)

Acknowledge lets advanced programmers create customized applications that ¢¢¢¢½ will accomplish many telecommunications tasks — from automatically picking up E-mail to communicating with VAXs. Version 1.0. Requires 512KE. $495. SuperMac Technology, 295 N. Bernardo Ave., Mountain View, CA 94043. NCP (Jan '89)

Allegro Common LISP's development environment is a full EMACS style editor ¢¢¢¢¢ called FRED that implements most Common LISP editing and debugging functions. Version 1.2. Requires 1 megabyte and a hard drive. $600. Coral Software, P.O. Box 307, Cambridge, MA 02142. NCP (Nov '88)

Aztec C is a C language that will appeal to users with a UNIX background. It uses ¢¢¢¢ many UNIX conventions and in the more expensive versions comes with standard UNIX utilities, including the VI editor. $75 beginners, $199 basic system, $299 development system, $499 commercial system. Manx Software Systems, P.O. Box 55, Shrewsbury, NJ 07701. NCP (May '86)

Basic Compiler is the long-awaited compiler for Microsoft BASIC. The interface is ¢¢¢½ unfriendly, but it gets the job done. Compiled programs run faster, but you can still tell they are written in BASIC. $195. Microsoft, 16011 N.E. 36th Way, Redmond, WA 98073-9717. NCP (May '87)

ExperCommon Lisp is a LISP development system. Not fully Common LISP com- ¢¢¢ patible, but creates good compiled code and stand-alone applications. Requires 1 megabyte +. $995. ExperTelligence, 559 San Ysidro Road, Santa Barbara, CA 93108. NCP (Aug '87)

ExperLISP is a useful programming language for high-level programmers. The ¢¢¢ more you use it, the more you'll figure out about it. $495. Requires 512K+. ExperTelligence, 559 San Ysidro Road, Santa Barbara, CA 93108. CP

ExperLogo is a version of the popular teaching language, Logo. Features three- ¢¢¢ dimensional graphics using "bunnies" rather than the usual "turtles." Very speedy, smooth program. Comes with an excellent manual. $149.95. ExperTelligence, 559 San Ysidro Road, Santa Barbara, CA 93108. CP

ExperProlog II is a Prolog based on the new Prolog II standard. Has the ability to ¢¢¢ handle infinite trees and allows user-defined functions that operate conditionally. Documentation is not the best and Mac interface is nonstandard. $495. ExperTelligence, 559 San Ysidro Road, Santa Barbara, CA 93108. NCP (Mar '87)

LPA MacProlog is a much improved program that includes incremental and opti- ¢¢¢¢ mizing compilers, a graphics environment package, and C and Pascal submodules. Version 2.0. Requires 1 megabyte +. $495. Programming Logic Systems, 31 Crescent Drive, Milford, CT 06460. NCP (Feb '88)

Mac C is a good, highly Mac-oriented implementation of this popular development ¢¢¢¢ language. Assembler and linker included. $425. Consulair, 140 Campo Drive, Portola Valley, CA 94025. NCP ★'85 Eddy

MacExpress is a development environment or shell. Programmers use it to save ¢¢¢ time and effort when developing stand-alone applications for the Mac. $195. ALSoft, P.O. Box 927, Spring, TX 77383. NCP (Feb '86)

MacForth Plus is an excellent implementation of the popular Forth programming ¢¢¢¢ language. New, reduced price; $199. Creative Solutions, 4701 Randolph Road, Rockville, MD 20852. NCP

Mach II is a multitasking implementation of Forth that allows local variables and ¢¢¢¢ text files. Can create stand-alone applications. Several windows can be up with different operations in each, operating concurrently. Execution is

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MINIFINDERS



fast. $99.95. Requires 512K+. Palo Alto Shipping, P.O. Box 7430, Menlo Park, CA 94026. NCP (Apr '86)

Macintosh 68000 Development System is a fairly traditional assembly lan- ★★★★ guage package. The two-disk set provides an editor (Edit), an assembler, a linker, an executive, and a resource compiler. $195. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. NCP

Macintosh Pascal is Apple Computer's version of this very popular programming ★★★ language. Loaded as it is with innovative teaching features, this interpreter is an excellent introduction to Pascal. $125. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. CP

MacScheme is a LISP dialect with "artificial intelligence" capabilities. Has a large ★★★ appetite for RAM. Interpreted language with Toolbox access limited to a small part of QuickDraw. $125. Semantic Microsystems, 4470 S.W. Hall St., Beaverton, OR 97005. NCP (June '86)

MacScheme+Toolsmith is a Mac version of Scheme, a LISP dialect. Beautiful ★★★★★ implementation, marred only by relative slowness compared to similar products. Get Toolsmith. Requires 1 megabyte +. $395. Semantic Microsystems, 4470 S.W. Hall, Beaverton, OR 97005. NCP (Aug '87)

Microsoft BASIC was the Mac's first programming language. This interpreter (it's ★★★★ not a compiler) now supports the Toolbox and the whole Mac interface can be implemented in your programs. For nonprogrammers, there are lots of programs available. $99. Microsoft, 16011 N.E. 36th Way, Redmond, WA 98073-9717. NCP ★'85 Eddy

MIDIBasic is a library of simple, but highly useful routines for writing MIDI software. ★★★★ Good stuff. Sketchy documentation. Works with both Microsoft and ZBasic. Requires 512K+ plus BASIC. $49.95. Altech Systems, 831 Kings Highway, Shreveport, LA 71119. NCP (Aug '87)

Object Logo is an object-oriented programming language with access to the ★★★★ Toolbox. Good product, but can't produce stand-alone applications. Requires 512K+. $79.95. Coral Software, P.O. Box 307, Cambridge, MA 02142. NCP (Aug '87)

Personal Prolog is an inexpensive and well-documented program. Has no debug- ★★★★ ging or search and replace facilities, making it a more appropriate tool for learning than development. Documentation and use of Mac interface are excellent. $64.95. Optimized Systems Software, 1221 B Kentwood Ave., San Jose, CA 95129. NCP (Mar '87)

Prolog/m is a solid Prolog following the Edinburgh standard. Has extensive debug- ★★★★ ging facilities, but you'll need a separate Toolbox disk with 58 additional predicates. Drawback: No true editing or printing facilities. $99.95. Chalcedony Software, 5580 La Jolla Blvd., La Jolla, CA 92037. NCP (Mar '87)

QUED (Quality Editor for Developers) is the ultimate source code editor. Loaded ★★★★ with useful and well-thought-out features, it will make any programmer's life much easier. It is not a word processor, however. $65. Paragon Concepts, 4954 Sun Valley Road, Del Mar, CA 92014. NCP (Mar '86)

THINK's Lightspeed C features rapid turnaround time for development and test- ★★★★½ ing of programs by the use of an integrated compiler, linker, and editor. Source-level debugger steps through your code line by line to examine the values of variables. Version 3.0. Requires 2 megabytes RAM. $175. Symantec, 10201 Torre Ave., Cupertino, CA 95014. NCP (Jan '89)

THINK's Lightspeed Pascal is a fast, powerful development system for Pascal ★★★★★ programming. Fully integrated Mac-like environment. Requires 512K+. $125. Symantec, 10201 Torre Ave., Cupertino, CA 95014. NCP (Feb '87)

TML Data Base Toolkit is an ISAM-type database that provides fast and efficient ★★★★ administration of large data files in applications developed with TML compiler. Supports multiple open index files. $89.95. TML Systems, 4241 Bay Meadows Road, Jacksonville, FL 32217. NCP (Dec '86)

TML (MacLanguage Series) Pascal is a good Pascal compiler, capable of produc- ★★★★★ ing stand-alone programs. Can use most existing Lisa Pascal programs with only slight modification. Requires 512K+. $99.95. TML Systems, 4241 Bay Meadows Road, Jacksonville, FL 32217. NCP (June '86) ★'86 Eddy

TML Source Code Library shows how to write programs that use custom definition ★★★★½ routines, speech, serial drivers, split bars, and other topics. Provided on three 400K diskettes. Requires TML Pascal. $79.95. TML Systems, 4241 Bay Meadows Road, Jacksonville, FL 32217. NCP (Dec '86)

Visual Interactive Programming is a unique visual programming system for cre- ★★★★ ating simple Macintosh applications. Programs are constructed in a flowchart-type manner. Easy access to most toolbox routines. $149.95. Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301. NCP (June '87)

ZBasic is a fast, interactive compiler capable of creating stand-alone applications ★★★★ that take advantage of Mac's unique features and abilities. Includes Edit, RMaker and MacInTalk. Requires 512K+. $89.95. Zedcor, 4500 E. Speedway Blvd., Tucson, AZ 85712. NCP (Dec '86)

EDUCATION

Alphabet Blocks teaches prereaders the letters and sounds of the alphabet. The ★★★★★ digitized voice of an on-screen elf is clear and pleasant. Very intuitive. Requires 1 megabyte +. $59.95. Bright Star Technology, 14450 N.E. 29th Place, Bellevue, WA 98007. NCP (May '88)

American Discovery is an interactive United States geography game that teaches ★★★ states, capitals, and, in a roundabout manner, postal codes. Suffers from small maps. Requires 512K+. Great Wave Software, 5353 Scotts Valley Drive, Scotts Valley, CA 95066. NCP (May '88)

ChipWits is a combination game and teaching tool. Players create programs to ★★★½ maneuver robots through a set of eight mazes. The programs are written in ChipWit's built-in icon-based programming language (IBOL). $49.95. BrainPower, 24009 Ventura Blvd., Calabasas, CA 91302. NCP ★'85 Eddy

Course Builder creates stand-alone educational applications. An easy-to-learn ★★★★ dedicated programming language uses blocks and arrows. Graphics, animation and sound can be integrated. Version 2.0 allows mathematical calculations. Poor documentation. $395, plus $10 shipping. Tele-Robotics International, 8410 Oak Ridge Highway, Knoxville, TN 37931. NCP (Oct '87)

KidsTime is a package of five quality educational programs for children between ★★★★ the ages of 3 and 12. The programs all have adjustable difficulty levels. Some use speech and one is a nice introduction to musical notes. Sparse documentation. $49.95. Great Wave, 5353 Scotts Valley Drive, Scotts Valley, CA 95066. NCP (Oct '86) ★'86 Eddy

LXR•Test generates tests from a database of questions. Makes it easy to modify ★★★★ and scramble test questions. Flexible output. Requires Mac 512KE+, two 800K drives, or a hard-disk drive. $199 or $399, depending on features. Logic eXtension Resources, 9651 Business Center Drive, Rancho Cucamonga, CA 91730. NCP (May '88)

Mavis Beacon Teaches Typing! has more features than a Selectric. Lots of ★★★★ diagnostics concerning typos. Incomplete docs. Version 1.1. Requires 1 megabyte. $49.95. Software Toolworks, 1 Toolworks Plaza, 13557 Ventura Blvd., Sherman Oaks, CA 91423. CP (Nov '88)

On Becoming a Desktop Publisher is a video training tape based largely on the ★★★★ syndicated television program, "The Computer show." Good primer on the fundamentals of DTP products. Will eventually become dated. Requires Beta or VHS VCR. $49.95. Ocean Communications, 1641 North First St., Suite 160, San Jose, CA 95112. (Sept '88)

Reader Rabbit teaches 4-to-8-year olds how to read in four elegant games that ★★★★★ play and build off of each other. Requires 512KE+ and an 800K drive. Mac II and MultiFinder hostile. Version 2.0 reviewed. $59.95. The Learning Company, 6493 Kaiser Drive, Fremont, CA 94555. CP (June '88)

Sensei Physics is a capable, intelligent, well-designed study aid. Covers Vectors ★★★★½ to Thermodynamics to The Nature of Light. Animated experiments let you try out concepts. Requires 512K+. $99.95. Broderbund Software, 17 Paul Drive, San Rafael, CA 94903. CP (Jan '88)

Type! is a typing tutorial that is both practical and flashy. It allows users to interrupt ★★★★½ and move easily between functions; however, use of the Return key or space bar are assumed but never explained. Version 1.0. Requires 512K. $29.95. Broderbund, 17 Paul Drive, San Rafael, CA 94903-2101. NCP (Nov '88)

Typing Instructor Encore recognizes that it's being used on a word processor. ★★★★ While it is easy to control, there are some strange bugs in the program. Requires 512K. $49.95. INDIVIDUAL Software, 125 Shoreway Road, Suite 3000, San Carlos, CA 94070-2704. NCP (Nov '88)

Typing Tutor IV consistently tests your use of all keys, including seldom-used ★★★ ones. It's hard to maintain user's attention span, as the testing material is unimaginative. Requires 512K. $49.95. Simon & Schuster, One Gulf and Western Plaza, New York, NY 10023. NCP (Nov '88)

ENTERTAINMENT

A Mind Forever Voyaging is a departure in text adventure games. It has a more ★★★ extensive vocabulary and a more involved story than most of the genre. The story here is gripping, but there are only a few puzzles to solve. Requires 512K+. $39.95. Infocom, 125 Cambridge Park Drive, Cambridge, MA 02140. NCP (Apr '86)

The Ancient Art of War gives users a chance to refight some famous campaigns ★★★★½ on both strategic and tactical levels. Campaigns can also be designed from scratch. Very playable, addicting game. Requires 512K+ Mac. $44.95. Broderbund, 17 Paul Drive, San Rafael, CA 94903. CP (Apr '86)

Balance of Power is the world's first computer peace game. This simulation ★★★★★ allows players to become either the President of the United States or General Secretary of the Soviet Union. Extraordinary artificial intelligence routines and general play make this a classic. $49.95. Mindscape, 3444 Dundee Road, Northbrook, IL 60022. CP (Prem)

Battle Stations is a deceptively simple game based on the pen and paper game of ★★★★ Battleship. Requires strategy on several levels. Makes excellent use of Mac sound and graphics. Fun, casual game, especially when the Mac is one of the players. Requires 512K+. $30. Timeline, P.O. Box 60, Ypsilanti, MI 48197. NCP (June '87)

Beyond Dark Castle brings back Prince Duncan in an encore performance to run, ★★★½ jump, and beat his way to victory. But really, just more of the same. Requires 512KE. $49.95, Silicon Beach Software, P.O. Box 261430, San Diego, CA 92126. NCP (Aug '88)

MINIFINDERS



Beyond Zork is yet another installment in the famous Zork series of text adventures. Find the fabled Coconut of Quendor to restore failing magic in this expert-level game. On-screen mapping and the Mac's window environment are utilized. $49.95. Infocom, 125 Cambridge Park Drive, Cambridge, MA 02140. NCP (Apr '88)

The Chessmaster 2000 is a masterful chess program that will appeal to both novice and master. You can view the board from 2-D or 3-D perspective and turn the board for a better look. Play is smooth and easy, and the program responds by voice. You may get tired of hearing "Gotcha," though. $39.95. The Software Toolworks, 13557 Ventura Blvd., Sherman Oaks, CA 91423. CP (July '87)

Chuck Yeager's Advanced Flight Trainer doesn't quite have the right stuff to hold interest for long. Simplistic controls. Lacks features found in versions for other computers. Verison 1.0. Requires 512KE and two 800K disk drives. $49.95. Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. NCP (Nov '88)

Crystal Quest combines all the good elements of nearly every video game ever made. Move a piece around to gobble up points and crystals. Shoot the nasties and get through the goal before they get you. Excellent sound effects. In color on the Mac II. Requires 512K. $49.95. Casady and Greene, P.O. Box 223779, Carmel, CA 93922. NCP (Apr '88)

Dark Castle is an outstanding achievement in action games which integrates RealSound with superb animation and graphics. You'll need better-than-average hand/eye coordination, but it's well worth the effort. Requires 512K+. $39.95. Silicon Beach Software, P.O. Box 261430, San Diego, CA 92126. NCP (Apr '87) ★'87 Eddy

Deja Vu: A Nightmare Comes True is a graphic adventure that breaks new ground. Innovative use of the Mac interface in a truly playable and exciting game. A great introduction to graphic adventure games. $49.95. Mindscape, 3444 Dundee Road, Northbrook, IL 60062. CP (Jan '86) ★'85 Eddy

Falcon simulates an F-16 fighter jet with gut-tightening, sweat-making realism. Go against MiGs and dodge SAMs scenarios. Requires 1 megabyte +. $49.95. Spectrum HoloByte, 2061 Challenger Drive, Alameda, CA 94501. NCP (May '88)

Fool's Errand is an outstanding collection of 80 puzzles woven around a mythical theme of an evil priestess and the search for wisdom. Requires 512K+. $49.95. Miles Computing, 7741 Alabama Ave., Canoga Park, CA 91304. NCP (July '88)

Gato puts players in command of an American submarine in World War II. This superb simulation game uses all of the Mac's graphic capabilities to really make you feel that "you are there." $49.95. Spectrum HoloByte, 2061 Challenger Drive, Alameda, CA 94501. CP (Nov '85)

GO is the Chinese equivalent of chess. Players plonk markers on a grid to gain territory and outwit an opponent or the computer. Requires 512K+. Mac II hostile; MultiFinder friendly. Version 1.0 reviewed. $49.95. Infinity Software, 1144 65th St., Studio C, Emeryville, CA 94608. NCP (June '88)

Handwriting Analyst produces a personality profile based on answers to questions about one's handwriting. It's simple and the results will amaze and astound. $49.95. Ciasa, 2017 Cedar St., Berkeley, CA 94709. NCP (Apr '88)

Klondike is a version of solitaire that uses video game-like scoring to create a superb, totally addictive game. Simple to play, nearly impossible to stop playing. Version 3.3. Shareware: $10. Unison Software, 415 Clyde Ave., Mountain View, CA 94043. NCP (Dec '87)

Leather Goddesses of Phobos is another in the long line of witty and entertaining Infocom text adventures. This one lets you choose your sex and comes with a 3-D comic and a scratch 'n' sniff card. It has three levels of play: tame, suggestive and lewd. $19.95. Infocom, 125 Cambridge Park Drive, Cambridge, MA 02140. NCP (Feb '87)

Lunar Rescue puts you in the role of a benevolent trader ready to save a moon colony from invasion. Blast the enemy while you travel from town to town trading goods for the supplies you need for your mission. Version 1.0. Requires 512KE. $59.95. Practical Computer Applications, 1305 Jefferson Highway, Champlin, MN 55316. CP (Jan '89)

MacGolf is a dynamic simulation of real golf. Players have a choice of courses and difficulty levels. Superb playability makes this a must for all golfers and gamers. Requires 512K+. $59.95. Practical Computer Applications, 1305 Jefferson Highway, Champlin, MN 55316. CP (May '86)

Mac Pro Football is a terrific sports simulation that gives you the chance to pit any combination of 38 Super Bowl teams against each other and direct team play. It comes with excellent, detailed (and necessary) documentation. Play selection can get a bit Byzantine. $49.95. Avalon Hill, 4517 Harford Road, Baltimore, MD 21214. CP (Mar '87)

MacRacquetball uses digitized videos and sounds of professional players for a realistic simulation. Has lots of control settings and can be played against someone else over a modem or between hard-wired Macs. Turn off hard disks before playing. $59.95. Practical Computer Applications, 1305 Jefferson Highway, Champlin, MN 55316. CP (Oct '87)

MoonMist is an introductory level text adventure game. This is a typical haunted English castle story, not quite up to Infocom's best. It has four versions, so it's good for more than one play. $39.95. Infocom, 125 Cambridge Park Drive, Cambridge, MA 02140. NCP (May '87)

MSFL: Pro League Football is a professional football league simulation that encourages people to play people, not the machine. Fast with lots of stats. Quirky MS-BASIC behavior. Spotty manual. No LaserWriter support. Requires 1 megabyte +. $49. MicroSports, P.O. Box 15799, Chattanooga, TN 37415. NCP (Apr '88)

NFL Challenge simulates coaching and watching professional football. Comes on two disks, one with program and System, the other with statistical data. Play against either human or computer coaching. Plays are selected from pre-defined playbooks. $99.95. XOR Corp., 5421 Opportunity Court, Minnetonka, MN 55343. NCP (June '87)

Ogre is a strategy tank game played on a hexagon grid. The ogre is an intelligent cybertank out to smash your command post. Customize your defense. Exceptionally good Mac interface. Has two-player option. $30. Origin Systems, 136 Harvey Road, Building B, Londonderry, NH 03053. CP (Nov '87)

Pinball Construction Set lets users create their own pinball games, as elaborate or as easy as desired. Uses MacPaint for backgrounds and has lifelike sounds (on 512K+ Macs). $39.95. Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. CP (Jan '86)

PT-109 by any other name is Gato, a WWII submarine simulator also put out by Spectrum. Three-year-old technology with a minor face lift. Version 1.0. Requires 512K. Mac II friendly; MultiFinder hostile. $49.95. Spectrum HoloByte, 2061 Challenger Drive, Alameda, CA 94501. NCP (Sept '88)

Quarterstaff is a fantasy adventure game of the typical "good versus evil" variety. Ability to use characters in other adventures gives this game a lot of potential for development. Version 1.2. Requires 1 megabyte +. $49.95. Simulated Environment Systems, 800 South Pacific Coast Highway, Redondo Beach, CA 90277. NCP (Mar '88)

Snake-Bar lets you guide a snake (or train or semi) through a maze, picking up objects that feed and make your snake grow. Options include changing languages, editing the maze, and an X-rated game. $15 (shareware). Georges Malmound, 37 Bis rue des Abbesses, Montmartre, 75018 Paris, France. NCP (Dec '87)

Solitaire Royale is a collection of eight solitaire card games. The Tour mode cycles through each game. Tournament deals the same hand for several players. $34.95. Published by Spectrum Holobyte, 2061 Challenger Drive, Alameda CA 94501. CP (May '88)

Space Quest is a three-dimensional, animated adventure in which you play a janitor in a dicey situation. All you have to do is get off your ship before it explodes and save the Earnon System. Runs on any Mac. $49.95. Sierra On-Line, P.O. Box 485, Coarsegold, CA 93614. CP (Sept '87)

Star Fleet I: The War Begins! is a space opera of the Star Trek variety. Rise through the ranks from ensign to admiral in this serialized adventure. Requires 512K+. $55. Interstel, P.O. Box 57825, Webster, TX 77598. NCP (May '88)

Strategic Conquest Plus challenges you to discover an unexplored world and conquer it by manufacturing and deploying armies, ships, and planes. A two-disk game that doesn't support an external drive. Requires 512K+. $59.95. PBI Software, 1111 Triton Drive, Foster City, CA 94404. CP (Feb '88)

Trust & Betrayal: The Legacy of Siboot requires negotiating with six artificial personalities in a struggle for power — not surprising considering that it comes from the maker of Balance of Power. Uses hieroglyphics to communicate in a fantasy world. Requires 512K+. Mindscape, 3444 Dundee Road, Northbrook, IL 60062. CP (Mar '88)

Uninvited is an icon-based adventure game set in an extremely haunted mansion. Graphic interface makes it easy to play. Animation and sound add to the thrill. $49.95. Mindscape, 3444 Dundee, Northbrook, IL 60062. CP (Sept '86) ★'86 Eddy

Winter Games lets up to eight players compete against each other in Olympic events including figure skating, bob sledding, biathlon, and ski-jumping. Excellent animation, good graphics, good theme music. $39.95. Epyx, 600 Galveston Drive, P.O. Box 8020, Redwood City, CA 94063. CP (Mar '86)

Wizardry is an outstanding dungeon exploration adventure pitting a party of up to six characters against the guardian monsters of the evil wizard Werdna. Capture his amulet to earn your reward. Even after solving the game, you'll want to go back into the dungeon. $59.95. Sir-Tech, Charlestown-Ogdensburg Mall, P.O. Box 245, Ogdensburg, NY 13669. CP

Your Personal Poet creates personalized greeting cards on the Mac. Comes complete with four greeting cards and matching envelopes. Requires 512K+. $29.95. Computer Poet, 775 E. Greg St., Sparks, NV 89431. NCP (June '87)

MINIFINDERS

MUSIC

Alchemy loads and edits digitally sampled sounds from most commercial samplers. Works with 512K, but it eats up memory quickly. Requires MIDI or RS-422 interface, and sampler. $495. Blank Software, 1477 Folsom St., San Francisco, CA 94103. CP (Oct '88)
★★★★★

Apple MIDI Interface is a simple Musical Instrument Digital Interface with a 1 megahertz clock rate. Has only one MIDI input and one output. Works with all Macs; adapter required for 128K and 512K. $99. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (June '88)
★★★

ConcertWare+MIDI is a composition and transcription program that can record multiple notes from a MIDI keyboard. Easy to use if you read music. Handles eight tracks of eight voices each. Requires 512K. Version 4.0. $149.95. Great Wave Software, 5353 Scotts Valley Drive, Scotts Valley, CA 95066. NCP (Dec '87)
★★★★

Cue: The Film Music System is a powerful and versatile assistant for scoring films. Automates spotting and logging cue points and searching for matching tempos. Also performs many minor jobs, such as generating a performing rights cue sheet. Version 2.0 reviewed. Requires 512KE. $595. Opcode Systems, 1024 Hamilton Court, Menlo Park, CA 94025. CP (Feb '89)
★★★★½

Deluxe Music Construction Set lets you enter up to 48 voices on eight staves, and play the music through the Mac's internal speaker and/or via MIDI. Requires 512K+. Mac II and MultiFinder hostile. Version 2.0 reviewed. $99.95. Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. CP (June '88)
★★★★

Jam Factory is a program for performing complex manipulations on MIDI data in real time. Unique, entertaining, and very powerful, but requires lots of patience and practice. Requires 512K+, MIDI interface, and MIDI synthesizer. $189. Intelligent Computer Music Systems, P.O. Box 8748, Albany, NY 12208. CP (Oct '87)
★★★

Jam Session is a music program for those who think MIDI refers to the length of skirts. Without any skill, you can "Jam" with rock, jazz, rap, or country tunes. A sort of "Sing Along With Mitch" for the computer set. Requires 512K+. $49.95. Broderbund, 17 Paul Drive, San Rafael, CA 94903. CP (July '88)
★★★★

Listen is an educational tool for ear training. It has both a piano keyboard and a guitar fretboard for the student to input notes, and offers a wide range of exercises. $99. Resonate, P.O. Box 996, Menlo Park, CA 94026. (Jan '87)
★★★★

M is a music composition and creation program that works with MIDI data in real time. Unique, entertaining, and very powerful, but requires lots of patience and practice. Requires 512K+, MIDI interface, and MIDI synthesizer. $219. Intelligent Computer Music Systems, P.O. Box 8748, Albany, NY 12208. CP (Oct '87)
★★★

Master Tracks Pro is a full-featured, second-generation MIDI sequencer that adheres to the Mac interface very well. It's the first program to have graphic-controller editing. Needs patch chasing for professional use, but it's still a rock-solid program. $350. Passport Designs, 625 Miramontes St., #103, Half Moon Bay, CA 94019. CP (Dec '87)
★★★★½

MIDIBasic is a simple, but highly useful routine for writing MIDI software. Good stuff. Sketchy documentation. Works with both Microsoft and ZBasic. Requires 512K+ plus Basic. $49.95. Altech Systems, 831 Kings Highway, Shreveport, LA 71119. NCP (Aug '87)
★★★★

Performer is the definitive MIDI sequencer, and is priced accordingly. Includes looping, SMPTE synching, 32 simultaneous Ins and Outs, unlimited overdubbing, and compatibility with Professional Composer for transcription. Version 2.2. Requires MIDI interface and 512K+. $395. Mark of the Unicorn, 222 Third St., Cambridge, MA 02142. CP (Jan '88)
★★★★

Practica Musica uses an interactive game and practice approach to teach music theory and ear training. Excellent training tool for the serious music student, it is also fun for anyone who wants to develop a trained ear for intervals, chords, and melodies. Requires 512K+. $125. ARS Nova Software, P.O. Box 40629, Santa Barbara, CA 93140. NCP (Nov '87) ★'87 Eddy
★★★★

Professional Composer produces performance-quality sheet music using Adobe's Sonata font. Scores can be created from scratch or imported from Performer (and can be exported to Performer for MIDI playback). Requires 512K+. $495. Mark of the Unicorn, 222 Third St., Cambridge, MA 02142. CP (Jan '88)
★★★½

Softsynth creates sounds for additive synthesis samplers. Downloading from Mac to sampler is time consuming. Requires 512K, sampler, MIDI interface. $295. Digidesign, 1360 Willow Road, Suite 101, Menlo Park, CA 94025. CP (Oct '88)
★★★★

Sound Designer set the standard for editing samples on lower-cost samplers, but it still lacks real-time high-fidelity playback. Requires 512K, sampler, MIDI interface. Emax, E II, 2000/2002, DSS-1, S900,$495; all others, $395. Digidesign, 1360 Willow Road, Suite 101, Menlo Park, CA 94025. CP (Oct '88)
★★★★

Studio Session consists of two programs, an Editor, and a Player, that produce music with six voices of digitized sound. Excellent program plus good manual make this a good buy. $89.95. Bogas Productions, P.O. Box 6699, Terra Lina, CA 94903-0699. NCP (Aug '87) ★'86 Eddy
★★★★½

Turbosynth creates sounds for a digital sampler using modular synthesis techniques. Good harmonic spectral inverter. Lacks an easy method of multisampling. Requires 1 megabyte, sampler, MIDI interface $349. Digidesign, 1360 Willow Road, Suite 101, Menlo Park, CA 94025. CP (Oct '88)
★★★★★

HARDWARE & ACCESSORIES

AppleCD SC reads CD-ROM optical discs that contain up to 656 megabytes of data. Also plays audio compact discs. Reads High Sierra format, an industry standard for CD-ROM. Requires SCSI port. $1,295. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (Dec '88)
★★★★

Apple Scanner is not the state of the art, but is adequate for scanner neophytes. The 4-bit (16 gray levels) scanner comes with AppleScan software and HyperScan, written by Bill Atkinson. Requires System 6.0; hard disk for full-page work; SCSI connection cables. $1,799. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. NCP (Feb '89)
★★★½

AST TurboScan is a 300 dpi scanner with sophisticated graphics software. Scans at resolutions from 72 to 300 dpi. Super-Scan software offers halftone, line art, and mixed modes. "Virtual memory processing" lets you scan images too large to fit in RAM. $1,899. Requires 512K+. SuperScan software included. AST Research, 2121 Alton Ave., Irvine, CA 92714. NCP (Nov '87)
★★★★

Classic Professional Graphics Display is a low-cost color monitor for the Mac II. Good value, but has an IBM-look about it. Green tint is annoying. Requires Apple video card. $549. Classic Components, 1490 Artesia Blvd., Gardena, CA 90247 (June '88)
★★★½

CMS S-140 SCSI Hard Disk is a very fast, high-capacity SCSI hard disk with a unity interleave and average access time of 18 milliseconds. Holds 140 megabytes. Help, file transfer, and tape back-up commands built-in. Hard Disk Partition is a useful DA. Comes with a 6-foot SCSI cable. $2,995. CMS Enhancements, 1372 Valencia Ave., Tustin, CA 92680. (July '87)
★★★★★

ColorVue SE is a video processor board for the Mac SE that lets you display 16 colors on an exernal RGB monitor. Slows up performance. $695. Orchid Technology, 45365 Northport Loop West, Fremont, CA 94538. (Oct '88)
★★★

DATA•PAK is a 45-megabyte removable Winchester hard disk. Great for backing up your main hard disk or transporting large amounts of data between office and home. Requires SCSI connector and System 4.1/5.5 or later. Drive, $1,799.95; cartridges, $149.95 each or tri-pack for $419.95. MASS MICRO Systems, Inc., 550 Del Rey Ave., Sunnyvale, CA 94086-3258. (Jan '89)
★★★★

DaynaFile hooks up to a SCSI drive to read MS-DOS disks in the Mac environment. Use Mac applications to manipulate data created with an IBM PC. Comes in both 5.25 and 3.5 inch formats. $595 for single floppy. Dayna Communications, 50 S. Main St., Fifth Floor, Salt Lake City, UT 84144. (Jan '88) ★'87 Eddy
★★★★

DEST PC Scan 2000 is an 8-bit scanner that saves images in up to 256 levels of gray. Can be configured for IBM PCs. Requires 1 megabyte. Scanner, $1,495; Publish Pac software, $595; OCR text processor card, $995. DEST Corporation, 1201 Cadillac Court, Milpitas, CA 95035. NCP (Dec '88)
★★★★½

FAXstf is an early entrant in the fax modem race. Adequate, but slower than most fax machines, and using it as a normal modem requires changing plugs. Requires 1 megabyte of memory, and a hard disk is strongly recommended. $695. STF Technologies, P.O. Box 247, Higginsville, MO 64037. NCP (Feb '89)
★★★

Felix is an optical-tracking graphics tablet that replaces a mouse. Precision mode gives pixel-by-pixel control. Doesn't collect dirt like a mouse does. The 6-inch square device is designed primarily for right-handed people. Works with Mac Plus. $149. Lightgate, 6202 Christie Ave., Emeryville, CA 94608. (Sept '88)
★★★★

Grappler LQ hooks Macs up to parallel laser and 24-pin letter-quality printers. A cable, driver software, and special fonts combine to make dozens of once-unfriendly printers now compatible with the Mac. Requires 1 megabyte and a parallel printer. $149. Orange Micro, 1400 North Lakeview Ave., Anaheim, CA 92807. (Nov '88)
★★★★

Hard Disk 20SC is Apple's 20-megabyte SCSI hard disk. Reliable, fairly noisy unit. Good utility software, but no back-up yet. Requires cable and terminator ($80). Requires SCSI port, 512K+, new ROM. $1,299. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (Feb '87)
★★★★

Hewlett-Packard ColorPro Graphics Plotter is an eight-pen desktop plotter that requires third-party software to drive it. Fonts are limited to an optional Graphics Enhancement Cartridge that requires some BASIC programming. $1,295. Hewlett-Packard, 16399 W. Bernardo Drive, San Diego, CA 92127. (Feb '88)
★★★

MINIFINDERS



HyperDialer provides an interface between a phone and your Mac so you can ★★★½ "dial" a number using one of the Rolodex-type programs, like SideKick, Focal Point or QuickDex. Hooks up between the Mac's sound port and a telephone handset. Requires 128K. MultiFinder friendly. $39.95. DataDesk International, 7651 Haskell Ave., Van Nuys, CA 91406. (Sept '88)

ImageMaker shoots 35mm color slides direct from the Mac. Supports most ★★★★ presentation software. Uses patterns to represent colors. Not fully compatible with the Mac II. Requires 512K+. $4,995. MacDriver software, $149. Presentation Technologies, 743 North Pastoria Ave., Sunnyvale, CA 94086. (Feb '88)

ImageWriter LQ outputs letter-quality text and graphics at 216 dpi. To do so, it ★★½ reduces 72-dpi screen fonts to a third of their actual size. Takes a lot of memory. Printer Driver version 2.0. Requires 1 megabyte and large font sizes. $1,400. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (Jan '89)

IS/ONE tablet with **Penworks** software lets you use a corded or cordless pen or ★★★½ mouse and a high-res tablet for precise graphics input. Minor bugs with some applications and DAs. Keystroke macros can be launched from the tablet. Minimal documentation. Requires 1 megabyte +. $595 to $1145. Kurta, 4610 S. 35th St., Phoenix, AZ 85040. (Jan '88)

Jasmine Direct Drive 50 is a very quiet 1:1 interleave 50-megabyte hard drive and ★★★★★ one of the fastest SCSI drives around. A small fan keeps it cool, but it's still quiet. $1,159. Jasmine Technologies, 555 De Haro St., San Francisco, CA 94107. (Mar '88) ★'87 Eddy

LaserWriter IINT is Apple's mid-priced PostScript laser printer. It's faster than the ★★★ LaserWriter Plus, with blacker blacks. Gray scale is less even than that of Plus. Requires 512K+. $4,599. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (May '88)

Laser Writer IINTX is Apple's top-of-the-line PostScript laser printer. 68020 chip ★★★★½ makes it very speedy; expandable to 12 megabytes; SCSI hard disk can be attached for fonts. Requires 512K+. $6,599. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (May '88)

LaserWriter IISC is Apples's low-end QuickDraw laser printer. Can be upgraded to ★★★ IINT or IINTX; reasonably fast. Requires 1 megabyte +. $2,799. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (May '88)

Mac-101 is a keyboard alternative that has a good feel to it. Has a keypad, 15 ★★★★ function keys, and more. The 101-Keys desk accessory lets you define macros. Comes in an ADB version for the SE and II. Requires 512K+. $169.95. DataDesk International, 7650 Haskell Ave., Van Nuys, CA 91406. Software NCP (Apr '88)

Mac-105 Keyboard is a good alternative to Apple's Extended Keyboard, with a ★★★½ larger Return key, higher and more sculpted key tops, and a lower overall weight. Requires Mac SE or Mac II. $179; with QuicKeys, $199. Cutting Edge, P.O. Box 1259, Evanston, WY 82930. (Feb '89)

MacADIOS II is a hardware and software interface for laboratory instruments. ★★★★ Standard configuration samples up to 142 kilohertz. Documentation is sketchy. $1,290 for Macintosh II-ready data acquisition card; $600 for MacADIOS II software interface. GW Instruments, 264 Msgr. O'Brien Highway, Cambridge, MA 02141. (July '88)

MacBottom HD21 is a very low (about 2 inches high), external 20-megabyte hard ★★★★★ drive. Fits under the Mac. Very quiet, very reliable. Good utility software, including HFS Backup. Requires SCSI port, 512K+, new ROM. $1,195. PCPC, 4710 Eisenhower Blvd., Tampa, FL 33634. (Feb '87) ★'86 Eddy

Mac Crate 60MB Hard Disk puts a Seagate drive in a platinum casing. At $14 per ★★★★ megabyte, it's a good consumer value. Also comes in 20-, 40-, and 80-megabyte models. Requires SCSI port. $839. Crate Technology, 6850 Vineland Ave., Bldg. M, North Hollywood, CA 91605. (Nov '88)

MacLarger is a 12-inch external monitor for 512K machines on up to the SE. ★★★ Displays the same number of pixels as an internal monitor, only one-third larger. Bigger and brighter, but less crisp than the Mac's own screen. $449. Power R, 1606 Dexter Ave. North, Seattle, WA 98109. (Apr '88)

MacPacq transforms the Macintosh into a digital oscilloscope, waveform genera- ★★★ tor, and chart recorder. PacqManager is software expandable via external routines in Turbo Pascal and other languages. Version 1.03 reviewed. $995. Biopac Systems, 42 Aero Camino, Goleta CA 93117. NCP (July '88)

MacRecorder is an easy-to-use sound digitizer. Includes software to turn sounds ★★★★½ into HyperCard buttons, mix sounds, add special effects, and convert sound formats. Stereo recording possible on a Mac II. Requires 512K+. $199. Farallon Computing, 2150 Kittredge St., Berkeley, CA 94704. NCP (June '88)

MacTablet is a stylus-driven graphics tablet. Users can easily sketch or trace art ★★★★ using this absolute-positioning device. Has a working area the size of the Mac screen. Allows concurrent use of the mouse. $495. Summagraphics Corp., 777 State St. Extension, Fairfield, CT 06430. (Jan '86)

MacTilt/MacTilt SE is a Mac (and external drive) holder that allows a full range of ★★★★ swiveling and tilting. Very strong, this well-made unit is also very easy to use. $99.95. Ergotron, P.O. Box 17013, Minneapolis, MN 55418.

MacVision is a digitizer that uses an ordinary video camera for input. Capable of ★★★★ extremely fine results and special effects. Easy to use and well-documented. $349.95. Koala, 269 Mount Hermon Road, Scotts Valley, CA 95066.

Microtek MSF-300C is a 300-dpi flatbed scanner. Really fast when used with ★★★½ optional MS-SCSI/C adapter. Comes with Versa-Scan Plus software (NCP) to scan and manipulate image. Saves images in a number of formats including TIFF and MacPaint. $1,895. Microtek Lab, 16901 S. Western Ave., Gardena, CA 90247. (Dec '87)

NetModem is a 1200-baud modem that can be accessed by all users on an ★★★★ AppleTalk network. The modem's display lights and the dial tone are simulated on-screen. Requires 512K+. $599. Shiva, Suite 1200, 222 Third St., Cambridge, MA 02142-9919. (Feb '88)

Personal LaserPrinter is a non-PostScript laser printer at a great price. Clumsy ★★★★ workarounds required in some applications. Printing can be slow. Requires 1 megabyte +. $1,999. Fonts Plus, $299. General Computer, 580 Winter St., Waltham, MA 02154. (Apr '88)

Personal Writer PW15 S is a tablet-based handwriting recognition system that ★★★★ also allows graphics and macros. Number of misread characters is too high for general word processing. Requires 1 megabyte +. $895. Personal Writer, 1801 Avenue of the Stars, Los Angeles, CA 90067. Software NCP (Mar '88)

PhoneNET is an AppleTalk-compatible network. Network can be up to 3,000 feet ★★★★★ in length. In-place, unused phone cabling can be used for network, and can be combined with AppleTalk on the same network. $59.95 per node. Farallon Computing, 2150 Kittredge St., Berkeley, CA 94704. (Dec '86) ★'87 Eddy

ProPoint replaces the mouse with an ADB trackball. Works better on the SE than it ★★★ does on the Mac II. Lefties will find the button positions uncomfortable. Requires SE or Mac II. $139.95. Abaton, 48431 Milmount Drive, Fremont, CA 94538. (Oct '88)

QMS Colorscript 100 is the first color PostScript printer that uses a four-color ★★★★ thermal wax transfer technology. Works on AppleTalk. Excellent typographic capability. Currently supports only a handful of applications. Requires 1 megabyte. $21,995. QMS, 1 Magnum Pass, Mobile, AL 36618 (Oct '88)

QMS-PS 810 is an eight-page-per-minute, 300-dpi PostScript laser printer that ★★★½ competes with the LaserWriter IINT. 2 megabytes of RAM is standard; upgradable to 3 megabytes. Emulates HP LaserJet, 7475 (HPGL), and Diablo 630. $5,495. Laser Connection, 7852 Schillinger Park West, Mobile, AL 36608 (July '88)

QuickShare adds a SCSI port to an IBM PC for easy connectivity with a Mac. Can ★★★ use an IBM's hard disk to run Mac applications. Requires SCSI port. Mac II and MultiFinder friendly. Version 1.24 reviewed. $465. Compatible Systems, P.O. Drawer 17220, Boulder, CO 80308. (June '88)

Radius Accelerator 25 can make your Mac SE run 50 percent faster than a Mac II. ★★★★★ The add-in accelerator card has a Motorola 68020 CPU that runs at 25 megahertz, and an optional 25 megahertz 68881 math coprocessor. $1,695; $2,195 with optional 25-megahertz 68891. Radius, 404 East Plumeria Drive, San Jose, CA 95134. (Oct '88)

SpeedCard is an accelerator board for the Macintosh SE that more than doubles ★★★★½ the speed of most applications. The board uses the 68000 chip found in the SE and an optional floating point 68881 chip for number crunching. Requires Macintosh SE. $399; $699 with coprocessor. SuperMac Technology, 295 North Bernardo Ave., Mountain View, CA 94043. (Nov '88)

Tektronix 4693D Color Printer is a 300 dpi bit-mapped color printer. Colors look ★★★★ smooth and rich. Uses bit-mapped screen fonts; most type has noticeable jaggies. Requires Mac II with color monitor. Recommended 8-megabyte configuration, $11,490. Tektronix, P.O. Box 500, Beaverton, OR 97077. (Oct '88)

ThunderScan replaces the ribbon cartridge in an ImageWriter, which is required to ★★★★ use it. Laser scans art that can be run through the ImageWriter, producing high-quality digitized images. The images can be manipulated as they are created or afterward. $249. Thunderware, 21 Orinda Way, Orinda, CA 94563. ★'85 Eddy

TimeWand is a bar-code reader with a built-in time/date stamping clock. Can ★★★★ be used with TimeWand Manager software, a database that's extensive though difficult to use. Poor docs, but good support. Requires 1 megabyte +. TimeWand 2K version, $198; TimeWand Manager, $489. Videx, 1105 N.E. Circle Blvd., Corvallis, OR 97330-4285. (Dec '87)

Turbo Mouse ADB makes an excellent mouse replacement, even if you're not a ★★★★★ trackball fan. If you're seeking absolute control, you can buy the optional cdev that enables you to specify custom tracking and double-click speeds. $169.95; cdev $15 direct order only. Kensington Microware Ltd., 251 Park Ave. South, New York, NY 10010. NCP (Feb '89)

TV Producer is an add-in card that overlays Mac graphics and text onto a video ★★★ signal. Software is clumsy to use. Requires Mac II, Apple video card, and video souce. $599. Computer Friends, 14250 N.W. Science Park Drive, Portland, OR 97229. Software NCP (May '88)

V-series Smartmodem 9600 is the fastest modem you can get for the Mac. To ★★★★½ achieve high speeds, you'll need a special cable and software that supports the format. Requires 512KE, Mac-to-modem cable, and communications software. $1,299. Hayes Microcomputer Products, 705 Westech Drive, Norcross, GA 30092. (Jan '89)

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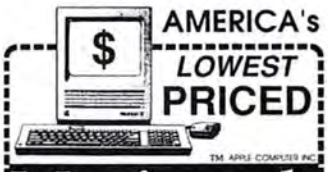
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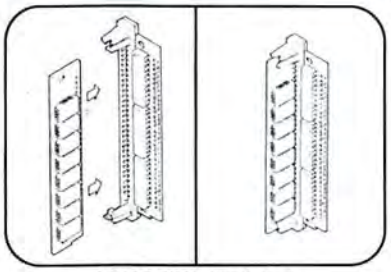
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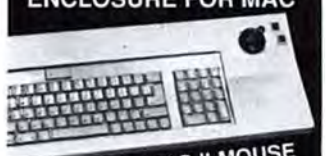
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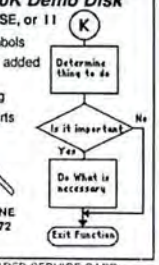
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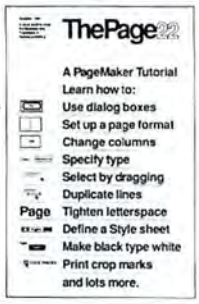
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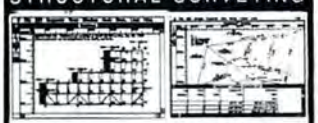
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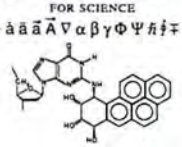
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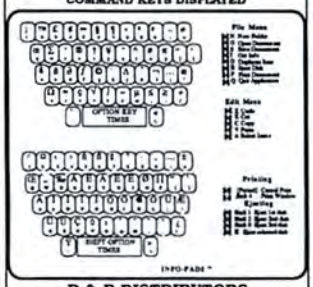
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category continued on next page

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SCRaPBOOK

EDITED BY KRISTI COALE AND JON ZILBER



UNDER COVER

The great Macintosh cover-up is at hand. Hide your computer under a designer dust cover by Crosby Creations — you may not fool anyone into thinking you've brought your Cuisinart to work, but you can protect your Mac from dust and spills. And when you feel you just can't face that computer for another minute, you can easily put it under wraps.

Crosby Creations makes Computer Covers for over 300 computers and printers, with covers available for just about every CPU, monitor, mouse, and keyboard configuration. There's an SE-on-MacTilt set and even a Mac-II-standing-on-end dust cover.

Made of anti-static, lint-free nylon, the covers come in either standard- or premium-quality material. Prices vary, but a typical computer set (monitor and keyboard covers) retails for $24.95 standard, $25.95 premium; a regular-size printer cover is $19.95. The dust covers come in gray, tan, driftwood, dark green, red, burgundy, and two shades of blue. Private-label logos and custom fabrics and colors are available.

Crosby Creations is located at West 529 Cleveland, Spokane, WA 99205; (509) 327-6884.

— *Laura Johnson*

20,000 LEAGUES WRITTEN IN C*

Like most football fans, I've dreamed about playing in the NFL. I can just see myself dropping back to pass with merely seconds to go in the game. I've sent Gayle Sayers on an end around pattern, but alas, he is not open. Right then, I spot Mike Ditka, who is wide open down field. With Dick Butkis in my face, I loft the ball toward Ditka — he catches it and falls into the end zone.

The Mac can, to some extent, make my football fantasy — and yours — a reality. I can be a member of the '85 Bears, the '72 Dolphins, or even the '76 Raiders whenever I play Micro Sports Football. Others like me have discovered this phenomenon — many have formed leagues, each with participants from all over the country.

And, with version 2.0, having participants in remote locations isn't a problem, thanks to a new modem play feature. A team in Huntsville, AL, can play the same game simultaneously with a participant in Pullman, WA — as long as they have a Mac and a modem. You can even download or upload plays to CompuServe. Don't worry too much about being charged for time, because you'll be on-line for only two minutes or so.

Suppose you want to study the stats from the game or see printouts of various plays. This new version is LaserWriter compatible, so you can see them in high resolution. There are more advantages to being a Micro Sports Football participant. Imagine being able to sign a new player for only $39.95 (Pro Draft disk) or buying the rights to O.J. Simpson or Joe Namath for only $49.95 (500 Great Teams disk). Yet another instance where fiction is certainly better than fact. However, participating in the league still proves to be as ulcer-inducing as the real thing (the Mac can't change some things).

Interested in forming your own league or participating in an existing one? For $49.95, you can have your own copy of MSFL Pro League Football. For more information on leagues, contact Micro Sports, P.O. Box 15799, Chattanooga, TN 37415; (615) 842-2098.

— *George Gipp*

*Well, it was written in MS-BASIC, but "20,000 Leagues Written in MS-BASIC" wouldn't have made any sense.



PETER A. GOULD

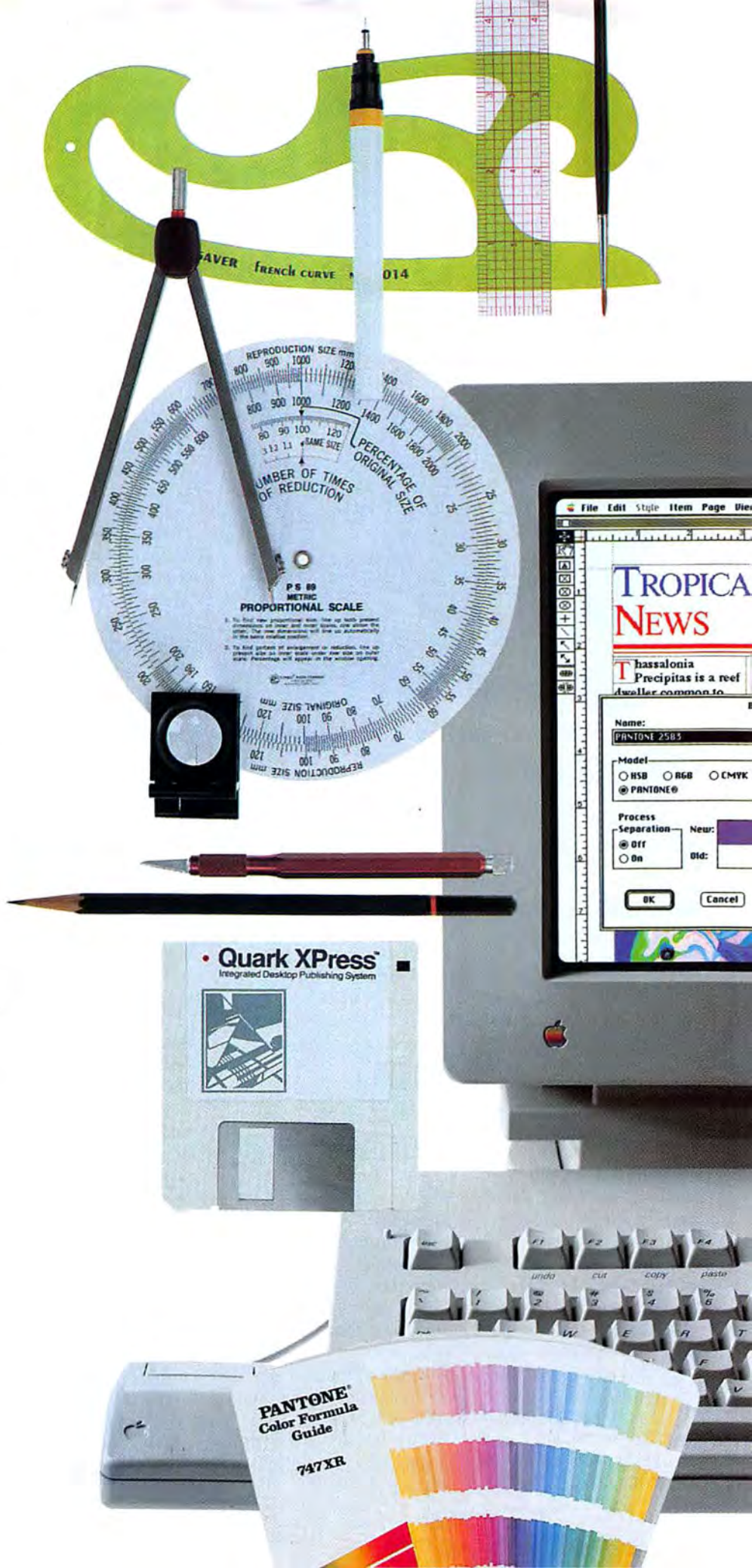
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SCRaPBOOK

LUNAR RESCUE

Lunar Rescue brings to mind that light beer commercial. You know the one: "Tastes great!" "Less filling!" In the case of Lunar Rescue, somewhere two computer gamers must be endlessly going back and forth: "Exciting action!" "Intriguing strategy!" Furthermore, Lunar Rescue, like good beer, is an escape from mere earthly concerns and keeps you coming back for more.

Pop open a floppy and drink in the scenario: The moon is in big trouble. Raiders have stolen the five crystals to the vital Independent Computerized Ecosystem (ICE), which defends and maintains the moon's 26 cities and outposts and their connecting canyons. You are an interplanetary trader who wanders onto the scene and offers to help. You're going to have to zap the heavy defenses in the canyons, trade with the cities for money and supplies, and, most important, find and restore the ICE. Good luck. You'll need it.

Lunar Rescue's white-on-black vector-type graphics are reminiscent of Asteroids/Megaroids, though you have a much larger choice of weapons and a much more complicated game scenario. Best of all, the controls — without a joystick so often awkward on the Mac — feel great. For the first few minutes of play you'll probably just want to zoom around in your ship through the canyon at full throttle. After you've settled down, you'll spend more time mastering the intricacies of your different weapons and defenses, including space cannons, lasers, bombs, decoys, and cloaking devices.

But Lunar Rescue is not just another arcade-style game. What separates it from the dozens of dazzling but ultimately boring (for some of us, at least) action games is that it combines many elements of strategy games as well. The game stimulates not only your reflexes but your brain. A typical game runs not just a few minutes but a few hours (and, joy of joys, you can save your game in progress).



You start off with a ship and some money. In order to recover the ICE you'll need to do a lot of searching in the canyons, which will require lots of weapons, fuel, and, yes, new ships. To get these supplies you'll find wrecks of previous would-be lunar saviors containing these items and other valuable commodities such as chemicals, food, and robots. You can sell these items in the cities, where you can also buy supplies you need — if they're available. Prices of items vary by city, depending on local shortages and economic conditions. Smart players pay attention to the economic situation and try to profit from it. Buy cheap, sell dear: you were, after all, a trader before enlisting to save the moon.

To win the game you'll need to develop a pattern of play, alternating between exploring the canyons for valuables and the ICE and returning to cities for repairs and trading. Often you'll be faced with the dilemma of either risking going on to the next city without much fuel or returning to a nearby city you just left. If you're too conservative, the moon will continue to deteriorate and your task will become harder. On the other hand, if you're too adventurous you may find yourself losing a lot of ships and eventually running out of money.

While you're in the canyons, the main game windows are uncluttered and elegant. One large screen gives you a detailed picture of the action, while a smaller radar screen provides the larger context of what's ahead of and behind you. Although in general the graphics are excellent, it's not so easy to distinguish between the different kinds of attack turrets — important information, since the missile turrets are much deadlier than the others and must be eliminated first when on the attack.

Other windows tell you about your cargo, weapons, and fuel. There's a lot of information on the screen at one time, and it takes some time to get accustomed to keeping an eye on everything and decoding what you need to know quickly and efficiently. It will also take a fair amount of time before you develop a feel for the type and quantity of supplies you will need to carry with you. Patience is the best bet here.

The instruction manual includes everything you need to know to play, though its organization is somewhat confusing. Get a six-pack today and indulge.

— *Larry Husten*

Lunar Rescue
★★★★½



List Price: $59.95
Published by: PCAI, 1305 Jefferson Highway, Champlin, MN 55316; (612) 427-4789.
Version: 1.0
Requires: 512KE
Compatibility: Mac II and MultiFinder hostile.
Copy Protection: Key disk protected.

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SCRaPBOOK

ICON SEE CLEARLY NOW

Look at an icon on your computer screen. Are the images fuzzy? Can you tell an *a* from an *e* ? If your eyes sting and your head aches, you may want to try the Sher-Mark Anti-Glare Magnification Screen by Sher-Mark Products.

The Sher-Mark screen has a circular polarizing filter (from Polaroid) that improves contrast and reduces glare. For ease of viewing, the magnification lens enlarges screen images to more than twice their normal size.

Made of lightweight plastic, the screen attaches quickly to your Mac or other 9-inch computer screen via an adjustable arm and space bar. The screen hangs from the arm and is easily removed for storage. As with a magnifying glass, you move the screen forward or backward (by sliding the arm at the top and adjusting the space bar at the bottom) for a comfortable image size.

The Sher-Mark Anti-Glare Magnification Screen sells for $89.95. Contact Sher-Mark Prducts, 521 East 83rd Street, Suite 2R, New York, NY 10028; (212) 249-0494.

On the other hand, maybe you're just not blinking enough. Insufficient blinking — about once every three seconds is ideal, according to specialists — can lead to eyestrain (especially for contact-lens wearers), which can lead to a host of other ailments. For a free booklet with tips on how to train yourself to blink more frequently, send a self-addressed, stamped business-sized envelope to Boston Equalens/Blink, Polymer Technology, 100 Research Drive, Wilmington, MA 01887. (Polymer Technology is a manufacturer of gas-permeable contact lens materials.)

— *Laura Johnson*

GOING FOR THE GOLD

It's the best the world has to offer: athletes in their prime, the lighting of the torch, emotions running high. Only in *these* Olympics, the contestants are computers and computer programs — cold and calculating machines with all their artificial intelligence primed for battle. The only emotions belong to the human operators and the spectators. Welcome to the first Computer Olympiad. It will be held at the Park Lane Hotel in London, England, August 9 through 15, 1989, so you and your Mac still have some time to hone your strategies.

The Computer Olympics, organized by David Levy, president of the International Computer Chess Association, will feature tournaments for 20 "thinking" games such as chess, bridge, Scrabble, Mah Jong, and poker.

Also part of the Olympics will be exhibition games, pitting the best programs against human experts, and the first London Conference on Computer Games. For more information, contact David Levy, Computer Olympiad, 11 Loudoun Road, London NW8 OLP, England; (01) 624-5551.

— *Laura Johnson*

KEEPING 'EM IN STITCHES

If you're bored with paper output and slides aren't your thing, here's something new. Aisin Seiki and Enzan-Hoshigumi have teamed up to create the Personal & Original Embroidery Machine (P.O.E.M.), a stitchery device that takes your Mac graphics and translates them into embroidery.

This colorful sewing machine (it comes in three colors) should connect to any Mac and is expected to begin shipping in early 1989, for around $1,000.

So throw away those old embroidery hoops. Contact Aisin USA, 333 Sylvan Avenue, Englewood Cliffs, NJ 07632; (201) 569-7875.

— *I. B. Singer*

DO YOU KNOW ME?



A leftover from television's "Golden Age?"

Goldie Hawn's evil twin?

HIT LIST

When Mac users went trick-or-treating at Egghead Discount Software last October, these were the goodies they emerged with most often:

1. **Microsoft Word** — Microsoft
2. **Microsoft Excel** — Microsoft
3. **MacDraw II** — Claris
4. **TOPS** — TOPS
5. **PowerPoint** — Microsoft
6. **PageMaker** — Aldus
7. **Cricket Graph** — Cricket Software
8. **MacProject II** — Claris
9. **MacWrite 5.0** — Claris
10. **SuperPaint** — Silicon Beach Software

THE DEVIL'S ADVOCATE



The NeXT Grand Scheme

We sat there and waited in Davies Symphony Hall for what seemed like an eternity. On stage was a black podium. Near it was a simple table on which stood a vase full of flowers. The vase wouldn't be the only thing full of it at the hall this day. It was the rollout of the NeXT computer. It was the black cube from the mind of Steve Jobs.

It's hard to be objective about this guy. Ever since I criticized him some years ago, he has been less than cordial. It irritates me no end that each time he happens to see Will Hearst, the publisher of the *San Francisco Examiner*, he asks Hearst to fire me. I write a simple computer column for the locals in the *Examiner*. This has been going on for years. Personally, I have no respect for a rich guy like Jobs who has nothing better to do than try to ruin the careers of those who don't agree with him.

I'm telling you all this so you can take with a grain of salt my opinions of the NeXT computer. Let's start by saying what's right about it. Two things. First, it's designed for throughput with so-called I/O processors attached to every process. This makes the machine fast. It had better be fast, because there is a tremendous software overhead. The second thing he did right was to improve the Mac interface. (None of the improvements are impossible to implement on the Mac, given time.)

Now let's talk about what's wrong with this thing. First of all, Jobs seems to have a penchant for wacky disk drives, and this machine uses an experimental 256-megabyte, optical read-write drive from Canon. There is no evidence that this drive works or will ever work. It did no writing to the drive during the demo and nobody was even sure the machine did any reading from the disk. It reminds me of the screwball "twiggy" megabyte drive used originally on the Lisa. Designed by Apple while Jobs managed the Lisa project, the twiggy drive was a joke.

Jobs likes the Canon disk. He kept talking about how the owner will be able to take his whole life around with him on one of these disks. That should be funny when someone steals the disk or erases it.

I suspect, though, that the drive is a small part of a flawed but grand scheme. There had better be a master plan lurking, because if there isn't, then the machine is a strategic disaster.

Hear me out. Jobs insists that the NeXT computer, tentatively saddled with a $6,500 (university "discount") price tag, is for higher education. It's been tested by professors all over the country. It's obviously designed to be used by them as the students wisely use cost-effective Tandy and Apple computers. But the user isn't important. The environment has to be examined: colleges and universities. Folks, this is software bootleg country. No developer in his or her right mind will develop elaborate software for the NeXT computer because he or she won't be able to sell more than one or two copies before the software is networked all over the country. Jobs knows this.

So here's the game the way I figure Jobs will play it. First, he'll try to sucker some dopey third-party types into idiotically developing a few packages and let them try to sell them. Already he is using the bait of compatibility with the future IBM machines to lure them into the trap. (How he managed to put a deal together with IBM has everyone mystified, but he did it.)

A few eager beavers will bite and develop software for the machine. Once they try to market it in the educational community, they'll discover a black hole of piracy. Jobs will apologize for the problem. He'll then start a new program. It will go this way: NeXT will help developers write and/or port their code to the NeXT machine, and it will be bundled on one of the 256-megabyte disks and sold directly by NeXT. The idea will be to pack the disk full of software. So much so that NeXT will claim to the vendors that it won't be worth it to bootleg the stuff.

If all goes well, NeXT will have disks loaded with every conceivable program. And if NeXT sells only a few copies of the software and everyone in the world bootlegs it like mad, who cares? Not NeXT — this technique moves hardware. It's the grand scheme. Everybody at NeXT gets rich, and the developers are fooled again. If, for some unknown reason, the professors decide to be honest and actually buy software (hah!), NeXT will have the market locked up. You buy a NeXT computer, a NeXT monitor, a NeXT laser printer, and NeXT-branded software.

You've got to give a guy credit for coming up with an integrated marketing scheme such as this, and you can be sure that this is the plan. But like other plans of mice and men, it can go awry — and Jobs has always shown a tendency to parade products with obvious Achilles' heels. We can remember the Apple III, with its nondetachable keyboard, incomplete upward compatibility with the Apple II, and a tendency to melt. By the time it was fixed, it was too late. We can remember the Lisa, with its dingbat twiggy drive and a promised network that never worked. By the time it was fixed, it was too late. We can remember the 128K Mac, with its megabit port and single floppy drive. It was fixed in time (barely), thanks to new management. Thus Jobs quit to start NeXT. One has only to poke around this machine for a moment to realize that he's done it again, and the disk drive once more looks like the Achilles' heel.

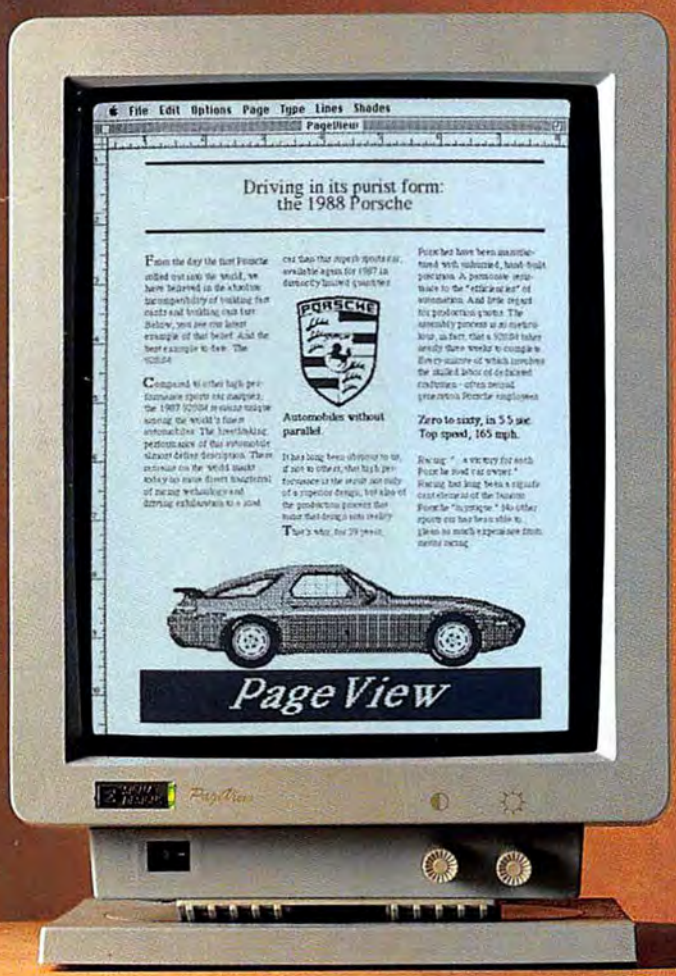


There are probably other problems too. We'll see. Whatever the case, by the time it's fixed, it will be too late.

BY JOHN C. DVORAK

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